

## Bachelor in Computer Application SCHEME OF EXAMINATION

The Number of paper and the maximum marks for each paper together with the minimum marks required for a pass are shown against each subject separately. It will be necessary for a candidate to pass in the theory part as well as practical part of a subject/ paper, separately. Award of Division to Successful candidates at the end of final year examination shall be as follow:

First Division           60% of the aggregate marks prescribed for optional papers of part I, Part II and Part III Examination, taken together (450 + 450 + 450 =1350). Marks Obtained in compulsory papers will not be counted for award of Division.

Second Division       48%

Pass                       below 48%

**Admission rule to the course will be as par Government / University policy declared from time to time.**

### Teaching and Examination scheme for Bachelor in Computer Application Part-I Examination. – 2014

Paper Name (Theory)		Exam Hours	Max Marks
Compulsory			
Paper 1 General English		3	100
Paper 2 General Hindi		3	100
Paper 3 Environmental studies		2	100
Paper 4 Elementary Computer Application Theory		2	60
Practical		2	40
<b>Optional</b>			
BCA-101	Fundamental Mathematics for Computer Application	3	50
BCA-102	Computer Fundamentals and Office Automation	3	50
BCA-103	Internet and Web Programming	3	50
BCA-104	Fundamentals of 'C' Programming	3	50
BCA-105	Database Management System	3	50
BCA-106	Computer Architecture	3	50
<b>Total of Theory</b>			<b>300</b>
<b>Paper Name (Practicals)</b>			
BCA-107	MS-Office Lab	3	50
BCA-108	'C' Programming Lab	3	50
BCA-109	Web Programming Lab	3	50
<b>Total of Practical</b>			<b>150</b>
<b>Grand Total(Theory + Practical)</b>			<b>450</b>

Teaching and Examination scheme for  
Bachelor in Computer Application  
Part-II Exam. – 2015

Paper Name(Theory)		Exam Hours	Max Marks
<b>Optional</b>			
BCA-201	Data Structure	3	50
BCA-202	OOPS With C++	3	50
BCA-203	Computer Networks	3	50
BCA-204	Operating Systems	3	50
BCA-205	Discrete Mathematics	3	50
BCA-206	Advanced Database Management System	3	50
<b>Total of Theory</b>			<b>300</b>
<b>Paper Name( Practicals )</b>			
BCA-207	Data Structure Lab	3	50
BCA-208	C++ Programming Lab	3	50
BCA-209	UNIX & DBMS Lab	3	50
<b>Total of Practical</b>			<b>150</b>
<b>Grand Total(Theory + Practical)</b>			<b>450</b>

Teaching and Examination scheme for  
Bachelor in Computer Application  
Part-III Exam. – 2016

Paper Name(Theory)		Exam Hours	Max Marks
<b>Optional</b>			
BCA-301	Software Engineering and Visual Basic	3	50
BCA-302	Java Programming	3	50
BCA-303	Network Security	3	50
BCA-304	Advanced Web Programming	3	50
BCA-305	Computer Graphics	3	50
BCA-306	E-Commerce E-banking & Cyber Security	3	50
<b>Total of Theory</b>			<b>300</b>
<b>Paper Name(Practicals)</b>			
BCA-307	Java and VB Programming lab	3	50
BCA-308	Advanced Web Programming and CG lab	3	50
BCA-309	Project	3	50
<b>Total of Practical</b>			<b>150</b>
<b>Grand Total(Theory+ Practical)</b>			<b>450</b>

**Note:**

1. Ten questions will be set in all papers taking two questions from each unit. Students will have to attempt one question from each unit.
2. Each practical exam is to be conducted by two examiners one External and one Internal. External examiner should be senior lecturer from jurisdiction of MGS University. External Examiner will prepare question paper of Practical Examination. Students have to perform exercise on computer. Exercise must be written in answer books in proper documentation. Marks distribution for Practical of 50 marks is as under
  - a) Three Exercise of 10 marks each 30 Marks  
(Logic 04, Execution 03, Documentation 03)
  - b) Viva-Voce 10 Marks
  - c) Laboratory Exercise File 10 Marks
3. Marks distribution for Project of 50 marks is as under
  - a) Project Dissertation and Presentation 35 Marks
  - b) External Viva Voce 15 Marks

Duration: 3 Hours

MM: 50

**BCA-101: Fundamental Mathematics for Computer Application**

**UNIT I**

Matrices: Basic Definitions, Matrix Operations – Transpose, Adjoint And Inverse of a Matrix, Determinates of Matrix, Some Special Matrix Definitions – Orthogonal, Hermetian, Skew Hermetian, Unitary, Rank of a Matrix, Elementary Transformations, Homogeneous System of Equations, Solution of Linear Equation Using Matrices as Determinates by Cramer's Rule.

**Unit II**

Limit, Continuity, Differentiability, Differentiation – The Derivative, Higher Derivatives of Second and Third Order, Application of Differentiation Maxima and Minima.

**Unit III**

Integration: Theory of the Integral, Properties of the Definite Integral, Methods of Integration By Substitution, By Parts, By Partial Fractions,

**Unit IV**

Co-Ordinates System: Rectangular Co-Ordinates in a Plane, Distance Between Two Points, Rectangular Co-Ordinates in Space, Elementary Co-Ordinate Geometry, The Straight Line, General equation of a Circle, Standard equation of a Circle.

**Unit V**

Vectors and Solid Geometry-Concept of Vector, Addition and Subtraction of a Vector, Resolution of a Vector, Scalar or Dot Product of two Vector, Vector or Cross Product of two Vectors, Equation of Lines and Planes.

**References:**

1. Mathematics Volume I By R.D. Sharma (Danpat Rai Publication)
2. Mathematics Volume II By R.D. Sharma (Danpat Rai Publication)
3. Engineering Mathematics Volume I By S.S. Sastry (Prentice-Hall Of India)

Duration: 3 Hours

MM: 50

## **BCA-102: Computer Fundamentals and Office Automation**

### **Unit I**

Historical Evolution of Computers, Characteristics, Classification and Application of Computer, Block diagram, Basic Components of Computer System: Central Processing Unit, Memory Unit, Microprocessor; Various I/O Devices their Functions and Characteristics; Types of Memory (Primary & Secondary); Classifications of Printers; Interconnecting the Units of a Computer, Assembly and Disassembly of PC and its various Parts, Specification of a desktop and Laptop currently available in the market (Specifications of processor, motherboard, memory, interface & capacity of HDD & DVD drives, I/O ports etc); Startup Process (Booting), BIOS Setup and its various setting, Trouble shooting for basic computer failures.

### **Unit II**

Need & Types of Software: System & Application software; Programming Languages: Machine, Assembly, High Level, 4GLs, Assemblers, Compilers and Interpreter; Objectives of Operating System, Concept of CUI & GUI, Installation of Windows operating System, Installation of Printer and Other Software Packages such as Ms Office etc. Backup and Restore Operations. Features of Windows; Various versions of Windows, Desktop, Explorer, Searching, Recycle Bin, Settings using Control Panel, System Tools, Disk cleanup, defragmentation, scanning for virus, Windows Accessories.

### **Unit III**

Features of Word Processor: Create, edit, store, print documents, Navigation of documents, cut, copy & paste, Find & replace, Different Page Views and layouts, Alignment, formatting features, Tabs & Indents, Inserting tables, pictures, hyperlinks, Spell checking, Macros, Mail merge, Template, Wizards, Overview of Index and Tables. Importing and exporting to and from various formats.

### **Unit IV**

Features of Spreadsheet: Concept of worksheet, workbook, creating, saving and editing a workbook, Inserting, deleting Worksheets, Navigation in worksheets; Working with Formula & Functions (Financial, Database, Maths, Trigonometric, Statistical etc), Cell referencing, Format Feature, Alignment, Character styles, Date Format; Previewing & Printing a worksheet; Goal Seek, Pivot Table, Creating Charts. Types of Charts, their merits and demerits; Database in worksheet, Data organization- what-if analysis, Macro, linking and embedding.

### **Unit V**

Database concepts using Access, Creating Tables, Data Types, Entering Data, Table Design, Indexing, Importing Data, Operators and expressions, expression builder, various functions of access, Creating Queries, Setting Relationship using Wizards, Creating Forms, Controls and components of form, Master table and transaction table. Join property, various join options available in access, Creating & Printing Reports.

Power Point Presentation Package: Creating Presentation, Setting backgrounds, layouts, Customizing, Formatting a presentation, Adding Graphics and effects to the presentation.

### **References:**

1. Computer Fundamental By P.K. Sinha (BPB Publications)

©MGSU, Bikaner

2. IT Tools and Applications By Satish Jain, Shashank Jain, Dr. Madhulika Jain (BPB Publication).
3. Upgrading and Repairing PCs By Scott and Mueller, Techmedia, New Delhi
4. Rapidex MS Office By Vikas Gupta (Pustak Mahal)
5. Fundamentals of Computers By Balagurusamy E, Tata McGraw-Hill
6. Teach yourself Access. Sieglal, BPB

Duration: 3 Hours

MM: 50

## **BCA-103: Internet and Web Programming**

### **Unit I**

**Internet:** Introduction to Internet, Internet Application, Internet Protocol, TCP/IP, Getting Information on Internet, Internet Services Provider (ISP), Addressing in Internet, Domain Names, Portals; Electronic Mail, Advantages, How it's Works?, Anatomy of an e-mail Message, basic of sending and receiving, E-mail Protocol, Content of an E-mail message, Finding an E-mail Address, attachments to E-mail. Mailing List- Subscribing, Unsubscribing, Reading and replying, Spamming.

### **Unit II**

**Introduction to World Wide Web:** Search Engine, search engine category, Downloading, Hyper Text Transfer Protocol (HTTP), URL, Web Servers, FTP, Working of Browser, Internet Explorer, Web publishing Document Interchange Standard, Component of Web Publishing, Site and Domain Name, Maintain and Updating, Overview of Intranet and its applications.

### **Unit III**

**HTML Fundamentals:** What is HTML? Basic HTML Tools, HTML Terminology, Creating HTML document, Comments, Headings, Fonts, Lines, Hyperlinks, Anchors, List, Working with Images. Working with Form: Creating Forms, Navigating through a Form, Access Keys, Processing Forms, Design Issues, Working with Frames: What is Frames, Creating Framed Documents, Formatting Frames, Communication between Frames, Inline Frames?

### **Unit IV**

**Working with Style Sheets:** What are Style Sheets, Elements of Style Sheets, Using Embedded Style Sheets and Linked Style Sheets, Inline Style Sheets, using Classes, Style Sheet Precedence, Div and Span.

**Java Script:** Working with Variables, Operators, Control Structures, Build-in functions.

### **Unit V**

**Cyber Security:** Definition, cybercrime and information security, classification of cybercrime, cybercriminals, phishing, password cracking, keyloggers, DoS and DoS attacks, SQL Injection, Cyber Law, The Indian IT Act, Digital Signatures and IT Act, Cyber security and organizational implications, Cyber crisis management. Cybercrime and Punishment, Cyberlaw Technology and Students: Indian Scenario.

### **References:**

1. Internet and Web Page Designing By V.K Jain (BPB)
2. Web Enabled Commercial Application Development Using HTML, DHTML, Java script, Perl CGI By Ivan Bayross (BPB)
3. Cyber Security By Nina Godbole, Sunit Belapure, Wiley India, New Delhi

Duration: 3 Hours

MM: 50

## **BCA-104 Fundamentals of 'C' Programming**

### **Unit I**

Basic concepts of programming, Characteristic, Implementation of Algorithm, Flow Chart Symbol, Benefit and Limitations, Decision Table, Pseudo Code. Programming Techniques: Top down, Bottom up, Modular, Structured, Features, Merits, Demerits and their Comparative study.

### **Unit II**

Structure of C Program; Character Set, Tokens, Variable, Constant, Data Types, Expressions, Operator, Precedence and Associativity of operators, Type Conversions. Console Input-Output functions. Control Flow: Statements and Blocks, Branching statements and Labels.

### **Unit III**

Loop Structure: while, do while, for; Modular programming: Type of Function, Declaration and definition, Function call, Parameter passing, Nesting of function, Recursion, Scope of variables, Storage classes.

### **Unit IV**

Arrays: Declaration and use of Array, Array manipulation; Searching, Insertion, Deletion of an element, Strings as array of characters, Standard library string functions. Pointer: Definition, declaration, Initialization; Accessing a variable and address of a variable, Pointer expressions, arithmetic; Pointers and Function Arguments, Pointers and Arrays, Dynamic memory allocation.

### **Unit-V**

Structure, Union: Declaration and use. Programs to show the use of structure, union. Nested Structure, Array of Structures; Concept of Files, Text File, Binary File, Functions for File Handling; Basic Input/Output operations on files. File Name as Command Line Argument.

### **References:**

1. ANSI C By Balagurusamy (Tata McGraw Hill)
2. Programming with C By Byron Gottfried (Tata McGRAW HILL)
3. Working with C By Yashvant Kanetkar (BPB)
4. C Programming Language By Kernighan (Prentice Hall of India)
5. C Programming By R.B. Patel (Khanna Publication)
6. Let us C By Yashwant Kanetkar (BPB Publication)



Duration: 3 Hours

MM: 50

## **BCA-105 Database Management System**

### **Unit I**

Introduction to DBMS: DBMS an Overview, Purpose of Database System, Advantages of DBMS, Characteristics of Database Approach, Data Abstraction, Levels of Abstraction, Data Models, Overview of Network, Hierarchical, and Relational Model, Instances and Schema, Data Independence, Architecture of DBMS, Application Programmers and Database Administrators their function.

### **Unit II**

Entity Relationship Model: Entity sets, attributes and keys. Tuples, Domains, Relation and Relationship sets, Role and Structural Constraints, Weak and Strong entity types; Entity-Relationship Diagram, Design of an E-R Database Schema, Features of E-R Model, Specialization and Generalization. Relational Model: Introduction to Relational Model, Integrity constraints over relations, Enforcing Data Integrity, Relational Data, Logical Database Design, E-R model to Relational Model.

### **Unit III**

Relational Algebra and Relational Calculus: Operations on Relational Algebra, Operations on Relational Calculus, Tuple Relational Calculus, Domain Relational Calculus.

### **Unit IV**

Database Design: Database Design Process, Relational database design, Relational Schema, Anomalies in a database; Functional Dependencies: Types of functional dependencies, Closure, Canonical Cover, Lossless Decomposition, Dependency Preservation; Normalization: 1NF, 2NF, 3NF, BCNF, 4NF, 5NF.

### **Unit V**

Introduction to SQL, Data Types, Operators, Components of SQL: DDL, DML, DCL, DQL; Commands: Create, Alter, Drop, Truncate, Insert, Update, Delete, Grant, Revoke, Commit, Savepoint, Rollback; Basic SQL Queries, Union, Intersect and Except, Nested Queries.

### **References:**

1. Database Management System By A. Silberschatz, Henry F.Korth, S. Sudershan(McGraw-Hill)
2. An Introduction to Database Syatem By C.J. Date(Addision Wesley)
3. Fundamentals of Database Systems By Elmsari and Navathe(Addision Wesley)
4. Principals of Database Systems By J.D. Ullman(Galgotia Publications)
5. SQL, PL/SQL By Ivan Bayross, BPB

Duration: 3 Hours

MM: 50

## **BCA-106 Computer Architecture**

### **Unit I**

Data Representation: Data Types and Number Systems, Complements, Binary Arithmetic, Fixed-Point Representation, Floating Point Representation, BCD, Excess-3 Codes, Gray Code, ASCII Codes, Unicode, Error Detection and Correcting Codes. Digital Logic Circuits: Logic Gates, Universal Gates, Boolean Algebra.

### **Unit II**

Map Specification; Combinational & Sequential Circuits, Half Adder & Full Adder, Multiplexer, Demultiplexer, Encoder, Decoder, Flip-flops: RS, D, JK & T Flip-flops, Binary Counters; Introduction to Microprocessors and Microcontrollers: Elements of 8085 microprocessor.

### **Unit III**

Central Processing Unit: General Register Organization, Stack Organization, Instruction Formats, Program Control, RISC, CISC; Addressing Mode, Data Transfer and Manipulation Basic Computer Organization and Design: Instruction Codes, Computer Registers, Computer Instructions, Timing and Control, Instruction Cycle, MRI.

### **Unit IV**

Input Output Organization: Peripheral Devices, I/O Interface, Asynchronous, Data Transfer, Modes of Data Transfer, Priority Interrupt, Direct Memory Access, Input-Output Processor; Serial Communication.

### **Unit V**

Memory Organization: Classification of Semiconductor memory, Main Memory, Auxiliary Memory, Associative Memory, Buffer, Cache Memory, Virtual Memory. Introduction to basic computer Programming: Assembly Language, Assembler.

### **References:**

1. Computer System architecture By M.Morris Mano (Prentice Hall)
2. Digital Computer Electronics By Malvino Leach, Jerald A. Brown(McGraw Hill)
3. Digital Computer Fundamentals By Thomas C. Batre (McGraw Hill)

**Teaching and Examination scheme for**  
**Bachelor in Computer Application**  
**Part-II Exam. – 2015**

<b>Paper Name(Theory)</b>		<b>Exam Hours</b>	<b>Max Marks</b>
<b>Optional</b>			
BCA-201	Data Structure	3	50
BCA-202	OOPS With C++	3	50
BCA-203	Computer Networks	3	50
BCA-204	Operating Systems	3	50
BCA-205	Discrete Mathematics	3	50
BCA-206	Advanced Database Management System	3	50
<b>Total of Theory</b>			<b>300</b>
<b>Paper Name( Practicals )</b>			
BCA-207	Data Structure Lab	3	50
BCA-208	C++ Programming Lab	3	50
BCA-209	UNIX & DBMS Lab	3	50
<b>Total of Practical</b>			<b>150</b>
<b>Grand Total(Theory + Practical)</b>			<b>450</b>

**Note:**

1. Ten questions will be set in all papers taking two questions from each unit. Students will have to attempt one question from each unit.
2. Each practical exam is to be conducted by two examiners one External and one Internal. External examiner should be senior lecturer from jurisdiction of MGS University. External Examiner will prepare question paper of Practical Examination. Students have to perform exercise on computer. Exercise must be written in answer books in proper documentation. Marks distribution for Practical of 50 marks is as under
 

a) Three Exercise of 10 marks each	30 Marks
(Logic 04, Execution 03, Documentation 03)	
b) Viva-Voce	10 Marks
c) Laboratory Exercise File	10 Marks
3. Marks distribution for Project of 50 marks is as under
 

a) Project Dissertation and Presentation	35 Marks
b) External Viva Voce	15 Marks

Duration: 3 Hours

MM: 50

**BCA-201 Data Structure**

**Unit I**

Primitive and Composite Data Types, Time and Space Complexity of Algorithms, Stack and Primitive Operation on Stack. Applications- Infix, Postfix, Prefix and Recursion. Queues, Primitive Operations on Queues, Circular Queue, De Queue and Priority Queue.

**Unit II**

Basic Operation on Linked List, Circular Linked List, Doubly Linked List, Linked Representation of Stack and Queue, Application of Linked List.

**Unit III**

Trees: Basic Terminology, Binary Trees, Tree Representation as Array and Linked List, Basic Operation on Binary Tree, Traversal of Binary Tree – In Order, Preorder, Post Order, Application of Binary Tree, Threaded Binary Tree, B-Tree and Height Balance Tree.

**Unit IV**

Sequential Search, Binary Search, Insertion Sort, Selection Sort, Quick Sort, Bubble Sort, Heap Sort, Comparison of Sorting Methods.

**Unit V**

Hash Table, Collision Resolution Techniques. Introduction to Graphs, Definition, Terminology, Directed, Undirected, Weighted Graph, Representation of Graphs, Graph Traversal – Depth First and Breadth First, Spanning Trees, Minimum Spanning Trees, Shortest Path Algorithm.

**References:**

1. Expert Data Structure with 'C' By R.B Patel (Khana Book Publishing Co.(P))
2. Data structure By Lipschutz (Tata McGraw Hill)
3. Data Structure By Yashvant Kanitkar (BPB)
4. An Introduction to Data Structures with Applications, By Jean-Paul tremblay, Paul G.Sarerson (Tata McGraw Hill)
5. Data Structure Using C and C++ By Yedidiah langsam, Moshe J.Augenstein, Arora M. Tenenbaum (Prentice- Hall India)

Duration: 3 Hours

MM: 50

## **BCA-202 OOPS With C++**

### **Unit I**

Object oriented programming, introduction to C++ classes; Classes and objects- classes, structure and classes, union and classes. Inline function, scope resolution operator, static class members- static data member, static member function, Arrays, pointers, references and dynamic allocation; Array of objects, passing objects to function, returning objects, object assignment, friend function and friend class.

### **Unit II**

Constructor and destructor: Parameterized constructor, multiple constructors in a class, Constructor with default argument, copy constructor, Dynamic constructor, Destructor. Function and operator overloading: definition, overloading unary and binary operator, overloading binary operator using friend, manipulation of strings using operators, Type conversion.

### **Unit III**

Inheritance: Defining derived class, single inheritance, multilevel inheritance, multiple inheritance, hierarchical inheritance, hybrid inheritance, Pointers to object, this pointer, pointer to derived class; Virtual function, pure virtual function, virtual base class, abstract base class, constructor in derived class, nesting of classes, templates.

### **Unit IV**

The C++ I/O system, basics of C++ streams, the basic stream classes: C++ predefined streams, formatted console I/O operations using the ios members, setting and clearing format tags, an overloaded form to setf (), examining the formatted flags, setting all flags, using width(), precision() and fill(); Using manipulators to format I/O, creating your own manipulators.

### **Unit V**

File I/O- files stream classes, opening and closing a file, reading and writing text files, binary files I/O- Get() and Put(), Read() and write(), More get() function, peek() and Putback(), flush(), random access, obtaining the current file position, I/O status- customized I/O files.

### **References:**

1. Object Oriented programming with C++ By E. Balagurusamy (Tata McGraw Hill)
2. C++ The Complete Reference By Herbert Schildt (Tata McGraw Hill)
3. Object Oriented Programming with C++ By Schaum Series (Tata McGraw Hill)

Duration: 3 Hours

MM: 50

**BCA-203 Computer Networks**

**UNIT I**

Need and advantages of networks, Network topology, transmission mode, Network categories: LAN, MAN & WAN, Network Protocols, Hardware and Software Protocols, Digital and Analog signal, encoding and modulating: digital to digital, analog to digital, digital to analog, analog to analog.

**Unit II**

Transmission media: - guided & unguided media, Guided Media: - Twisted Pair, Coaxial cable, optical fiber. Unguided Media: - Radio frequency Allocation, Propagation of Radio Waves, Terrestrial Microwaves, satellite Communication. Transmission media performance and properties, comparative study. Transmission Impairments: Attenuation, Distortion & Noise, Switching: - Circuit, Packet and Message Switching.

**Unit III**

OSI and IEEE 802 Model, Ethernet: - Working, Principle, 10 & 100 Mbps Ethernet, Token Ring, FDDI, Comparison, Data Link Control: - Flow control: Stop and Wait, Sliding Window. Error control: Automatic Repeat Request (ARQ), Stop and Wait ARQ, Sliding window ARQ, Data link control protocol: Asynchronous, synchronous, bit oriented and character oriented.

**Unit IV**

Transport layer: Duties of transport layer, connection, the OSI transport protocol, Network Technologies: - Fiber channel, ATM, SONET: Physical configuration, SONET Layers, SONET Frames and Applications. Network connectivity: - Hubs, Repeaters, Bridges, Multiplexer. Internet connectivity: - Router, Gateway, CSUs/DSUs. Modem: Transmission Rate and Modem Standards.

**Unit V**

Internet:- Overview of TCP/IP, IP addressing, Subnetting, Masking, IPV6, Comparison of IPV4 & IPV6, Network Security:- Privacy, Authentication, Integrity & Non- Repudiation, Firewall:- Benefit & type of firewall, Cellular Telephony- Frequency Reuse Principle, Transmission, Receiving, Handoff, Roaming, first generation, Second generation, Third generation.

**References:**

1. MCSE: Networking Essentials study guide By James Chellis (BPB)
2. Data Communications and Networking By Behrouza Forouzon (Tata McGraw Hill Edition 2004)
3. Data and Computer Communications by William Stallings, Pearson Education

Duration: 3 Hours

MM: 50

## **BCA-204 Operating Systems**

### **Unit I**

Introduction to Operating System: Time-Sharing, Parallel, Distributed, Real Time Systems. System Calls, System Programs, Process Concepts, Process Scheduling, Scheduling Criteria, Scheduling Algorithms.

### **Unit II**

Dead Lock: Characteristics, Method for Handling Dead Locks, Prevention, Avoidance, Detection and Recovery, Memory Management- Swapping, Paging- Page replace algorithm, Virtual Memory. Concurrency control.

### **Unit III**

Disk Structures, Disk Scheduling, Disk Management, Disk Security, Distributed System Structures- Network Operating System, Distributed Operating System.

### **Unit IV**

UNIX/LINUX: Introduction File System, File and Directory Structure, Inode and Block Storage. UNIX/LINUX commands, File Permission, File Related Commands, Shell and Kernel. Process- Init, Getty and Login Process, Killing, Changing Priority. Partitioning the Hard drive for Linux, Installing the Linux system. System administration: Managing user accounts-adding & deleting users, changing permissions and ownerships, Creating and managing groups, modifying group attributes.

### **Unit V**

Creating and mounting file system, checking and monitoring system performance file security & Permissions, becoming super user using su. Getting system information with uname, host name. Backup and restore files, installing and removing packages with yum rpm command. VI Editor. Shell Script: Variables, File Name Expansions, Shell Commands, Looping and Making Decisions.

### **References:**

1. Operating system principals By Abraham Silverschatz, Peter baer Galvin (john wiley and sons incorporation)
2. Operating system concepts and design By Milan Milen Kovic (Tata Mcgraw Hill)
3. Teach yourself unix By Kevin Reichard, Eric F Johnson (BPB)
4. Using unix By Philip Laplante (Jaico Publishing House)
5. Unix concept By Yashwant Kanetkar (BPB Publication)

Duration: 3 Hours

MM: 50

**BCA-205 Discrete Mathematics**

**UNIT I**

Statements (Propositions), Logical Operations, Truth Table, Tautologies, Contradiction, Logical Equivalence, Algebra of Propositions, Conditional and bi-conditional Statement, Argument, Logical Implication, Propositional Functions, Quantifiers, Negation of Quantifiers Statements, Normal Forms.

**Unit II**

Integers: Properties of integers, order and inequalities, Absolute value, Mathematical Induction, Division Algorithm, Divisibility, Primes, Greatest Common Divisor(GCD),Euclidean Algorithm, Fundamental Theorem of Arithmetic, congruence Relation.

**Unit III**

Set Theory: Sets and elements, Universal and empty set, subset, finite and infinite sets, power sets, partitions. Class of sets, Venn diagram, set operations, Algebra of sets, Duality Relations-Composition of relations, Type of Relation, closure Properties, Equivalence Relations, Partial Ordering Relation.

**Unit IV**

Boolean Algebra, Introduction, Basic Definition, Duality, Basic Theorems, Boolean Algebra as Lattices, Representation Theorem, Sum-Of-Products Form For Sets and for Boolean Algebra, Logic Gates and Circuits, Truth Table.

**Unit V**

Graph Theory, Graphs and Multi Graphs, Sub Graphs, Isomorphic and Homeomorphism Graphs, Paths, Connectivity, Various Type of Graphs, Graph Coloring, Representation of Graph in Computer Memory, Shortest Path Algorithm, Graph Traversal Algorithm (Depth First Search, Breadth First Search).

**References:**

1. Discrete Mathematics Schaum's Series By Seymour LipSchutz, Marc Lipson (Tata McGraw Hill)
2. Discrete Mathematics By Vinay Kumar (BPB).
3. Discrete Mathematical Structure By Dr. K.C.Jain, Dr. M.L. Rawat.



Duration: 3 Hours

MM: 50

## **BCA-206 Advance Database Management System**

### **UNIT I**

File Organization, Indexing and Hashing: Overview of the file organization, techniques, Secondary Storage Devices, Operations in files, Heap files, and Sorted files. Indexing and Hashing- Basic Concepts: Static Hashing, Dynamic Hashing, and Extendable Hashing. Ordered Indices, Types of single level ordered index, Other types of Indexes. Multi-Level Indexes: B-tree Index Files, B+ - Tree Index Files, Bitmap Index, Hash Index, RAID technology, Buffer Management.

### **Unit II**

Recovery: Reliability, Transactions, Reflecting, Update to the Database and Recovery. Buffer Management, Virtual Memory and Recovery, Disaster Recovery.

Concurrency Management: Serializability, Concurrency Control, Locking Scheme, Dead Lock and its Resolution, Atomicity, Concurrency and Recovery. Database Security and Integrity: Security and Integrity Threats, Defense Mechanism.

### **Unit III**

Introduction to PL/SQL, Advantages, Character Set, Data Types, Control Structure, Transaction, Cursor, Locks, Error Handling, Procedure and Functions, Triggers, granting and revoking permissions, packages.

### **Unit IV**

Distributed Database Management System: Components, Levels of Data and Process Distribution, Transparency Features, Data Fragmentation, Data Replication; Client Server Systems: Principals Components, ODBC, ADO, JDBC, and JSQL overview; Concept of Object Oriented Database Management System: Complex Data Types, Structured Types and Inheritance in SQL, Array and Multiset types in SQL, Object Identify and Reference types in SQL.

### **Unit V**

Data Mining and Data Warehousing: Decision Support System, Data Analysis and OLAP, Type of OLAP Servers, Data Warehouse Architecture: Concept of Multidimensional Data Model, 3-Tier Data Warehouse Architecture, Data Mining.

### **References:**

1. Database System Concepts By Korth, Siferschatz, Sudarshan (McGraw Hill)
2. An Introduction to Database Systems By Bipin C. Desai (Galgotia Publication)
3. SQL, PL/SQL Programming By Ivan Bayross (BPB)
4. Commercial Application Development using Oracle Developer 2000 By Ivan Bayross (BPB)

**Teaching and Examination scheme for**  
**Bachelor in Computer Application**  
**Part-III Exam. – 2016**

<b>Paper Name(Theory)</b>		<b>Exam Hours</b>	<b>Max Marks</b>
<b>Optional</b>			
BCA-301	Software Engineering and Visual Basic	3	50
BCA-302	Java Programming	3	50
BCA-303	Network Security	3	50
BCA-304	Advanced Web Programming	3	50
BCA-305	Computer Graphics	3	50
BCA-306	E-Commerce E-banking & Cyber Security	3	50
<b>Total of Theory</b>			<b>300</b>
<b>Paper Name(Practicals)</b>			
BCA-307	Java and VB Programming lab	3	50
BCA-308	Advanced Web Programming and CG lab	3	50
BCA-309	Project	3	50
<b>Total of Practical</b>			<b>150</b>
<b>Grand Total(Theory+ Practical)</b>			<b>450</b>

**Note:**

1. Ten questions will be set in all papers taking two questions from each unit. Students will have to attempt one question from each unit.
2. Each practical exam is to be conducted by two examiners one External and one Internal. External examiner should be senior lecturer from jurisdiction of MGS University. External Examiner will prepare question paper of Practical Examination. Students have to perform exercise on computer. Exercise must be written in answer books in proper documentation. Marks distribution for Practical of 50 marks is as under
  - a) Three Exercise of 10 marks each 30 Marks  
(Logic 04, Execution 03, Documentation 03)
  - b) Viva-Voce 10 Marks
  - c) Laboratory Exercise File 10 Marks
3. Marks distribution for Project of 50 marks is as under
  - a) Project Dissertation and Presentation 35 Marks
  - b) External Viva Voce 15 Marks

Duration: 3 Hours

MM: 100

**BCA-301 Software Engineering and Visual Basic**

**Unit I**

Software, Software Process, Process Characteristics, Software Process Model- Linear Sequential Model, Prototyping Model, Spiral Model, Software Quality, McCall's Quality Factors, Software Requirement Analysis and Specification (SRS) – Need Characteristics and Components. Planning a Software Project – COCOMO Model, Project Monitoring Plan, and Risk Management; Design Principle- Abstraction, Modularity, Cohesion and Coupling, Software Management-Size Oriented Matrices, Function Oriented Matrices.

**Unit II**

Debugging Process: Information Gathering, Fault Isolation, Fault Confirmation, Documentation, Fixing fault isolation; Testing: Testing Fundamental, Functional Testing (Black Box), Structural Testing (White Box), Alpha And Beta Testing; Testing Process: Comparison of Different Testing, Level of Testing. Project management for special classes of software projects: Using CASE tools, CBSE.

**Unit III**

Introduction to Visual Basic, Integrated Development Environment of Visual Basic, Event Driven Programming, Controls and Events, Variables, Constants, , Collections, procedures, Function Return Values, Control Flow Statements, Loop Statements Exit Statements, Arrays ,Controls Array; Working With Forms, Controls-Textbox, Progress Bar, Tool Bar , List Box, Combo Box , Option & Check Button, Scroll Bar, Slider, Tree View & List View Controls.

**Unit IV**

MDI and SDI form; Design Menu: Popup Menu, Program Menu Command, Using access and shortcut keys, Msg Box, Input Box, Common Dialogs Control, File: open, save, print, help dialog box; Text Box Control: Text selection, search, replace; Graphics with VB; Image Box, Picture Box, coordinates system, scale properties and methods, drawing methods: Drawing text, Box, Fill, Curves, timer control,; Dynamic link library.

**Unit – V**

Recursive Functions, Modules, Testing And Debugging Techniques, Data base programming -Data controls, Data Aware Controls, Data Manager, DAO (Direct Access Objects) Methods and Connectivity, ADO (ActiveX Data Objects), Connectivity with Oracle, Advantages of ADO over DAO, ODBC, Reports Writing, Using Crystal Reports, and Data Report.

**Reference:**

1. Mastering Visual Basic 6 By Evangelos Petroustos (BPB)
2. Visual Basic 6 programming- Black Book By Steven Holzner (Dream Tech Press)
3. Beginners Guide to Visual Basic 6 By Reeta Sahoo and G.B. Sahoo (Khana Publication House)
4. Software Engineering: A Practitioner's Approach by Roger S. Pressman, McGraw Hill.



Duration: 3 Hours

MM: 50

## **BCA-302 Java Programming**

### **UNIT I**

C++ v/s Java, Java, Internet and www, Java Support System, Java Environment, Java Virtual Machine, Java Program Structure, Tokens, Constant and Variables, Data Types, Scope of Variables, Type Casting, Operators and Expression; Conditional Statements and Loop Statements.

### **Unit II**

Defining a Class, Adding Variables and Methods, Creating Objects, Accessing Class Members, Constructors, Method Overloading, Static Member, Nesting of Methods, Inheritance: Extending a Class, Overriding Methods, Final Variables and Methods, Abstract Methods and Classes, Visibility Control.

### **Unit III**

Arrays: One Dimensional and Two Dimensional, Strings, Vectors, Wrapper Classes, Defining Interface, Extending Interface, Implementing Interface, Accessing Interface Variables, System Packages, Adding a Class to a Package, Using System Package, Adding a Class Into Packages, Hiding Class.

### **Unit IV**

Creating Threads, Extending the Threads Class, Stopping and Blocking a Thread, Life Cycle Of a Thread, Using Thread Methods, Thread Exceptions, Thread Priority, Synchronization, Implementing the Runnable Interface; Local and Remote Applets V/s. Applications, Applet Life Cycle, Applet Tag, Adding Applet to HTML File; Passing Parameters to Applets, Getting Input From User.

### **Unit V**

AWT: AWT Classes, Working With Frame Windows, Working With Graphics, Working With Color, Adding and Removing Controls, Responding to Controls: Labels, Buttons, Checkbox, Checkbox Group, Choice Control, Lists, Scroll Bars, Text Field, Text Area. Menus, Dialog Box Handling Events; Swings: Icons and Labels, Text Field, Buttons, Combo box; JDBC: Class Methods, JDBC Components, Driver, Connectivity to Database, Processing Result and Interfaces.

### **References:**

1. The Complete reference Java 2 By Patrick Naughton, Herbert Schildt (Tata McGraw Hill)
2. Programming in JAVA By E. Balagurusamy (TMH)
3. JAVA 2 programming Black Book By Steven Holzner et al. (Dreamtech Press)

Duration: 3 Hours

MM: 50

## **BCA-303 Network Security**

### **UNIT I**

Introduction to security attacks, need for security, security approaches, principals of security, types of attacks, Introduction to cryptography, Plain text and Cipher text, Substitution techniques, Transportation techniques, Encryption and decryption, Steganography, Key range and key size, possible type of attacks.

### **UNIT II**

Symmetric Key: Introduction, Symmetric key cryptography and the problem of key distribution, Algorithm types and modes, data encryption standards (DES), International data Encryption Algorithm (IDEA), Advanced Encryption Standard (AES).

### **UNIT III**

Asymmetric Key: Introduction, Asymmetric key operation, the RSA algorithm, Comparison between Symmetric and Asymmetric key cryptography, Digital signatures: Introduction, Message digest: idea and requirement, digital signature techniques.

### **UNIT IV**

Digital certificates, private key management, the PKI model, public Key Cryptography Standards,(PKCS), Internet Security protocols: Secure socket layer(SSL), Secure Hypertext Transfer protocol(SHTTP), Time Stamping Protocol(TSP), Secure Electronic transaction(SET), SSl versus SET, 3-D Secure protocol, Electronic money, Email Security.

### **UNIT V**

User Authentication Mechanisms: Authentication basics, Passwords, Authentication Tokens, Certificate based Authentication, Biometric Authentication, and Kerberos. Cryptographic solution using JAVA, Cryptographic solution using Microsoft and .NET, Cryptographic Toolkits, Security and operating systems. Network Security: Brief Introduction to TCP/IP, Firewalls, IP Security, Virtual Private Networks (VPN), Intrusion.

### **Reference:**

1. M.A. Miller, Data and Network Communications, Thomosn Learning.
2. Behrouz A Foruzan, Data Communication and Networking Tata McGraw Hill.
3. Cryptographic & N/W security: Principles & Practices by Stalling, Prentice Hall.
4. Cryptographic & N/W security by Atul Kahate, Tata McGraw Hill.
5. Network Security Essentials: Applications & standards by Stalling, Pearson Education Asia, 2003.

Duration: 3 Hours

MM: 50

## **BCA-304 Advanced Web Programming**

### **Unit I**

Overview of C#, C# and .NET, similarities and differences from JAVA, Structure of C# program. Language features- Type system, boxing and Unboxing, flow controls, classes, interfaces, Serialization, Delegates, Reflection.

### **Unit II**

Overview of ASP.NET framework; Understanding ASP.NET Controls, Applications Web servers, Installation of IIS. Web forms, web form controls -server controls, client controls, web forms and HTML, Adding controls to a web form, Buttons, Text Box, Labels, Checkbox, Radio Buttons, List Box etc. Running a web Application, creating a multiform web project.

### **Unit III**

Form Validation: Client Side Validation, Server Side Validation, Validation Controls- Required Field Comparison Range. Calendar Control, Ad Rotator Control, Internet Explorer Control. State Management-View State, Session State, Application State.

### **Unit IV**

Architecture Of ADO.NET, Connected and Disconnected Database, Create Connection Using ADO.NET Object Model, Connection Class, Command Class, Data adapter Class, Dataset Class. Display Data on Data Bound Controls and Data Grid. Database Accessing on Web Applications: Data Binding Concept With Web, Creating Data Grid, Binding Standard Web Server Controls. Display Data on Web Form Using Data Bound Controls.

### **Unit V**

Writing Datasets to XML, Reading Datasets with XML. Web Services: Introduction, Remote Method Call Using XML, SOAP, Web Service Description Language, Building & Consuming a Web Service, Web Application Deployment.

### **References:**

1. ASP.NET 2.0 Black Book By Rudraksh Batra, Charul Shukla (Dream Tech Press)
2. ASP. NET Bible By Mridula Parihar and et al. (Hungry Minds, New York)
3. Beginning C # By Karli Watson (Wrox)
4. C# By Joseph Mayo (Techmedia)

Duration: 3 Hours

MM: 50

## **BCA-305 Computer Graphics**

### **Unit I**

Introduction to Computer Graphics: Definition, Application Areas of Computer Graphics, Graphical User Interface (GUI), Cathode Ray Tubes, Random Scan Displays, Raster Scan Displays (With Introduction to Flickering, Interlacing. American Standard Video), Color CRT Monitors, Flat Panel Displays (Plasma Panels, Liquid Crystal Displays, Electroluminescent Displays), Graphics Software (GKS, PHIGS), Color Models (RGB, CMY, HSV, YIQ).

### **Unit II**

Raster Graphics Algorithms: Line Drawing Algorithms (DDA, Bresenham's algorithm), Circle and Ellipse Drawing Algorithms, Filling (Scan-Line Polygon fill Algorithm, Inside Outside Tests, Boundary Fill and Flood Fill Algorithm).

### **Unit III**

Transformations and Projections: 2-D transformations (Translation, Rotation, Scaling, Reflection, shearing), Homogeneous Coordinate Representation.

### **Unit IV**

3-D transformations(Translation, Rotation, Scaling), Projections- Parallel Projections, Perspective Projections, Bezier Curves, B-Spline Curves.

### **Unit V**

Two Dimensional Clipping and Visible Surface Detection Methods: Viewing Pipeline, WINDOW and Viewport, Line Clipping (Cohen Sutherland), Polygon Clipping(Sutherland Hodgement) Sutherland Cohen Sub Division Algorithm, Cyrus-Beck Algorithm, Classification of Visible Surface Detection Algorithm, Backface Algorithm, Depth Sorting Method, Depth Buffer Method, Area Subdivision Method.

### **References**

1. Computer Graphics By Hearn and Baker (Prentice Hall India)
2. Introduction to computer Graphics By Krihsnamurthy N (Tata McGraw Hill Edition)
3. Theory and problems of Computer Graphics (Schaum's Outline) By Zhigang X. and Plastock Ra. (Tata McGraw Hill).



Duration: 3 Hours

MM: 50

**BCA-306 E-Commerce, E- Banking and Cyber Security**

**Unit I**

E-Commerce: Benefits of E-Commerce, Impact of E-Commerce, E-Commerce v/s Traditional Commerce, Classification of E- Commerce: B2B, B2C, C2B, C2C; Applications of E-Commerce Technologies, Framework of E-Commerce, E-Commerce: Securing Network Transaction: Transaction Security, Cryptology, Cryptographic Algorithms, Authentication Protocols, Security Protocols of Web Commerce.

**Unit II**

Electronic Payment System: Introduction to Payment Systems, Online Payment Systems, Pre-Paid Electronic Payment Systems, Post-Paid Electronic Payment Systems; Digital Token, Smart Cards, Credit cards, Electronic funds transfer, Risks in Electronic Payment System, Security issues on electronic payment system, Solutions to security issues.

**Unit III**

Electronic data interchange (EDI), EDI: the nuts and bolts, EDI and Business Inter-organisational; Mobile Commerce: Introduction, Benefits of mobile commerce. E-banking: Definition, Transaction websites components, E-Banking support services, Wireless Banking. E-Banking Risk: Transaction/Operation Risk, Credit Risk, Liquidity/Internet Risk, Price Risk, Strategic Risk, Reputation Risk;

**Unit IV**

Cyber Crime: Definition, Cybercrime and Information security; Classification of cybercrime: E-Mail Spoofing, Spamming, Cyber defamation, Forgery, Hacking, Online Frauds, Pornographic Offenses, Software Piracy, E-Mail Bombing/Mail Bombs, Computer Network Intrusions, Password Sniffing, Identity Theft, Frauds in Mobile; Password Cracking, Keyloggers, DoS and DDoS Attacks.

**Unit V**

Cyberlaw: The Indian Context, The Indian IT Act, Amendments to the Indian IT Act, Cybercrime and Punishment, Cyberlaw, Technology and Students: Indian Scenario. Background of Cyberforensics, Digital Forensics Science. The Need for Computer Forensics, Cyberforensics and Digital Evidence, Forensics Analysis of Email, Security/Privacy Threats.

**References:-**

1. Developing E-Commerce Systems by Jim A. Carter PHI.
2. E-Commerce new vistas for business by T.N. Chandra, R.K. Suri, Sanjiv Verma, Dhanpat Rai & Co.
3. Mark O' Neill "Web Services Security", McGraw Hill.
4. Nixon Brian "Teach yourself E-Banking", SAMS.

5. E-Banking: Global Perspective by Vivek Gupta, Edition June 2000, ICFAI Univer Press.

## **BCA-309 PROJECT**

### **Practical Training and Project Work:**

1. Project Work may be done individually or in groups in case of bigger projects. However if project is done in group each student must be given a responsibility for a distinct module and care should be taken to monitor the individual student.
2. Project Work can be carried out in the college or outside with prior permission of college.
3. The Student must submit a synopsis of the project report to the college for approval. The Project guide can accept the project or suggest modification for resubmission. Only on acceptance of draft project report the student should make the final copies.

### **Submission Copy:**

The Student should submit spiral bound copy of the project report.

### **Format of the Project:**

(a) **Paper:**

The Report shall be typed on White Paper of A4 size.

(b) **Final Submission:**

The Report to be submitted must be original.

(c) **Typing:**

**Font:-** Times New Roman

**Heading:-** 16 pt., Bold

**Subheading:-** 14 pt, Bold

**Content:-** 12 pt.

**Line Spacing:-** 1.5 line.

**Typing Side :-** One Side

**Font Color:-** Black.

(d) **Margins:**

The typing must be done in the following margin:

**Left :** 0.75”

**Right:** 0.75”

**Top:** 1”

**Bottom:** 1”

**Left Gutter:** 0.5”

(e) **Binding:**

The report shall be Spiral Bound.

(f) **Title Cover:**

The Title cover should contain the following details:

**Top:** Project Title in block capitals of 16pt.

**Centre:** Name of project developer’s and Guide name.

**Bottom:** Name of the university, Year of submission all in block capitals of 14pt letters on separate lines with proper spacing and centering.

(g) **Blank sheets:**

At the beginning and end of the report, two white blank papers should be provided, one for the Purpose of Binding and other to be left blank.

**(h) Content:**

- I).** Acknowledgement
- II).** Institute/College/Organization certificate where the project is being developed.
- III).** Table of contents
- IV).** A brief overview of project
- V).** Profiles of problem assigned
- VI).** Study of Existing System
- VII).** System Requirement
- VIII).** Project plan
  - Team Structure
  - Development Schedule
  - Programming language and Development Tools
- IX).** Requirement Specification
- X).** Design
  - Detailed DFD's and Structure Diagram
  - Data structure, Database and File Specification
- X).** Project Legacy
  - Current Status of project
  - Remaining Areas of concern
  - Technical and Managerial Lessons Learnt
  - Future Recommendations
- XI).** Nomenclature and Abbreviations.
- XII).** Bibliography
- XIII).** Source Code.