

# **INSTITUTE OF COMMERCE AND MANAGEMENT**

**JIWAJI UNIVERSITY  
GWALIOR**



**BACHELOR OF COMPUTER  
ADMINISTRATION  
SYLLABUS  
AND  
EXAMINATION SCHEME  
2006-2009**

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**CO-ORDINATOR, B.C.A. PROGRAMME  
INSTITUTE OF COMMERCE AND MANAGEMENT  
CITY CENTRE ROAD, GWALIOR-474002 (M.P.)**

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# **BACHELOR OF COMPUTER ADMINISTRATION SYLLABUS**

**AND**

## **EXAMINATION SCHEME (SIX SEMESTER PROGRAMME)**

**(w.e.f. July 2007)**

### **SEMSTER – I**

<b>Code</b>	<b>Theory Paper</b>	<b>External</b>	<b>Internal</b>	<b>Practical</b>	<b>Total</b>
<a href="#"><u>BCA101</u></a>	Computer Fundamentals	80	20	-	100
<a href="#"><u>BCA102</u></a>	Programming in 'C'	80	20	50	150
<a href="#"><u>BCA103</u></a>	Digital Principals	80	20	-	100
<a href="#"><u>BCA104</u></a>	Communication Skills-I	80	20	-	100
<a href="#"><u>BCA105</u></a>	Mathematics-I (Discrete Mathematics)	80	20	-	100
BCA106	Software Laboratory in DOS & Windows	-	20	80	100
	<b>TOTAL</b>	<b>400</b>	<b>120</b>	<b>130</b>	<b>650</b>

### **SEMSTER – II**

<b>Code</b>	<b>Theory Paper</b>	<b>External</b>	<b>Internal</b>	<b>Practical</b>	<b>Total</b>
<a href="#"><u>BCA201</u></a>	Mathematics-II (Calculus)	80	20	-	100
<a href="#"><u>BCA202</u></a>	Data Base Management Systems	80	20	-	100
<a href="#"><u>BCA203</u></a>	Data Structure	80	20	-	100
<a href="#"><u>BCA204</u></a>	Application Software Packages	80	20	50	150
<a href="#"><u>BCA205</u></a>	Environmental Awareness	80	20	-	100
BCA206	Software Laboratory in FoxPro	-	20	80	100
	<b>TOTAL</b>	<b>400</b>	<b>120</b>	<b>130</b>	<b>650</b>

<b>Paper Code : BCA 101</b>	
<b>Name : Computer Fundamentals</b>	
Unit – I	<p><b>Computer system concepts</b></p> <p>Computer system characteristics, Capabilities and limitations, Types of computers-Analog, Digital, Hybrid, General, Special Purpose, Micro, Mini, Mainframe, Super, memory – RAM, EPROM, PROM and other types of memory. Data representation and codes, Decimal, Binary, Octal and Hexadecimal System and inter conversion, BCD numbers and ASCII codes.</p>
Unit – II	<p><b>Computer hardware</b></p> <p>Input devices-Keyboards, Mouse, Trackball, Joystick, Digitizing tablet, Scanners, Digital Camera, MICR, OCR, OMR, Bar-code Reader, Voice Recognition, Light pen, Touch Screen, Output devices- Monitors – characteristics and types of monitor- Digital, Analog, Size, Resolution, Refresh Rate, Interlaced / Non Interlaced, Dot Pitch, Video Standard- VGA, SVGA, XGA etc, Printers- Daisy wheel, Dot Matrix, Inkjet, Laser, Line Printer, Plotter, Sound Card and Speakers, Memory devices, RAM, ROM, Winchester drive, Mass storage devices, CD-ROM, Flash memory and their characteristics and uses.</p>
Unit – III	<p><b>System software</b></p> <p>Assemblers, Translators, Interpreters, Compilers, Operating System- Functions, Types-Batch, Single, Multiprogramming, Languages: High level languages, Procedural and Object Oriented languages. Application Software – Word Processing, Spreadsheet, Presentation Graphics, Data Base Management Software.</p>
Unit – IV	<p><b>Computer applications</b></p> <p>Office automation, Industrial applications, CAD/CAM, Library information system, Digital image processing, Multimedia applications, Space research.</p>
Unit – V	<p><b>Computer networking</b></p> <p>Goals and applications, LAN, MAN, WAN</p> <p>Computer communication: Communication modes: simplex, half duplex, full duplex.</p> <p>Types of Network – LAN, WAN, MAN etc., Topologies of LAN – Ring, Bus, Star, Mesh and Tree topologies, Components of LAN – Media, Bridges, HUB, Routers, Repeater and Gateways, communication Channels – Twisted, Coaxial, Fiber Optic, Serial and Parallel Communication, Modem – Working and characteristics, Types of Connections – Dialup, Leased Lines, ISDN, Use of Communication in daily life.</p>

<b>Paper Code : BCA 102</b>	
<b>Name : Programming in 'C'</b>	
Unit – I	<p><b>Programming Fundamentals</b>  Program Concept, Algorithms, Flow Charts – Symbols, Rules for making Flow chart, Types of flowchart, Advantage &amp; Disadvantage, techniques of problem solving : Programming Techniques – Top down, Bottom up, Modular, Structured – Features, Merits &amp; Demerits, Programming Logic – Simple, Branching, Looping, Recursion, Cohesion &amp; Coupling, Programming. Testing &amp; Debugging &amp; their Tools.</p>
Unit – II	<p><b>Programming in C</b> including  Features of 'C', Tokens, Variables, Expressions, Identifiers, Keywords Data Types, Constants, Operator and expression Operator: Arithmetic, Logical. Relational, Conditional and Bit wise Operators, Precedence and Associativity of Operators. Type conversion in expression, Basic input/output and library functions Single character input/output i.e. getch(), getchar(). Getche(), putchar(), Formatted input output i.e. printf() and scanf().</p> <p><b>Branching Constructs:</b> If-else, switch, and conditional operator &amp; go to statements.  If statement, If....Else statement, Nesting of If....Else Statement, else if ladder, The? : Operator, go to statement, Switch statement, Compound statement, Loop controls, for, while, do-while loops, break, continue, go to statement.</p>
Unit – III	<p><b>Functions</b> : Categories of functions User defined and library function, recursion, Function arguments, Return values and nesting of function, Recursion, Calling of functions, Scope and life of variables – local and global variable, Storage class specified – auto, extern, static, register.</p> <p><b>Arrays:</b> What is array, declaring initializing, 2D and 3D array. String : Declaration, string functions – strcat, strcpy, strcmp, strlen, strstr.</p>
Unit – IV	<p><b>Pointers:</b> Operations on pointers, pointers Basic of pointers and operators, Pointers and function, Array of pointers, Pointer and strings, Pointer to structure, Pointers within structure; The i.e. #if, #else, #elif and #ifdef &amp; undef Structures: The concept of structure of structure, intilizing a structure, the structure tag, period operator, array of structure, structure and pointer, te arrow operator and nesting of structure. Unions : initialization and use of it in a program.</p>
Unit – V	<p><b>File Management:</b> Introduction – File handling, File structure, File handling function. File types, Streams, Text, Binary, File system basics, The file pointer, Opening a file, Closing a file, Writing a character, Reading a character, Using fopen(), getc(), putc(), and fclose(), Using feof(), Working with string fputs() and fgets(), Standard streams in C, Flushing astream, Using fread() and fwrite(), Direct access file, fseek() and random access I/O, fprintf() and fscanf(), Command line arguments.</p>

<b>Paper Code : BCA 103</b>	
<b>Name : Digital Principles</b>	
Unit – I	Boolean algebra, Boolean equation of logic gates, Logic Gates, AND, OR, NOT, GATES and their Truth tables, NOR, NAND & XOR gates, Boolean Algebra, Basic Boolean Law's, Demorgan's theorem, Boolean laws and theorems, Duality theorem.
Unit – II	Karnaugh map, MAP Simplification, Minimization techniques, Sum of Product & Product of Sum, Pairs, Quads and Octats, DONOT CARE condition, Grey code, Multiplexer and Demultiplexer, BCD to Decimal decoder, Seven segment decoder, Encoder.
Unit – III	Arithmetic circuits, Binary addition, Unsigned binary numbers, Sign magnitude numbers, 2's complement arithmetic Addition, Subtraction, Overflow, Half adder, Full adder, Subtractor circuits.
Unit – IV	Flip flops, RS, D, JK, Master Slave, Shift registers, Types of shift registers, Asynchronous and Synchronous counters.
Unit – V	Semiconductor memories, Memory addressing, ROM, PROMS, EPROMS, RAMS, DRAMS, SRAMS, Memory cells A to D and D to A converters.

<b>Paper Code : BCA 104</b>	
<b>Name : Communication Skills – I</b>	
Unit – I	Noun, Pronoun, Adverb, Adjective and Verb in detail articles Sentence kinds, function & classification.
Unit – II	<b>Tenses</b> Present indefinite, present continuous, present perfect, past indefinite and combination of tenses Agreement synthesis.
Unit – III	<b>Transformation:</b> Simple, compound, complex, Reporte speech active & passive voice, degree, change the forms of sentence using too or enough, use of idioms & phrase synthesis.
Unit – IV	<b>Vocabulary:</b> Word building suffixes/prefixes. Forming noun from verb/adjective and vie versa common error relating to nouns, pronouns, verbs, adjectives, punctuation. Translation – Hindi to English & vice verse.
Unit – V	National events, monuments, personalities (thinkers, Sages, Politicians and social workers) some current international events & personalities.

<b>Paper Code : BCA 105</b>	
<b>Name : Mathematics – I (Discrete Mathematics)</b>	
Unit – I	<p><b>Introduction and Preliminaries:</b> Logical connectives, Truth tables, Tautologies and Contradiction, Logical equivalence, Algebra of propositions.</p> <p><b>Set Theory :</b> Set, Singleton set, Finite and Infinite sets, Subsets, Proper subsets, Equality of sets, Union, Intersection and Difference of sets, Universal set, De Morgan laws, Symmetric difference of sets, Generalized De Morgan laws, Cartesian product of sets.</p>
Unit – II	<p><b>Relations:</b> Relation between two sets, Binary relation on a set, Types of binary relations, Equivalence relation, Equivalence class, Partition of a set, Fundamental theorem of equivalence relation, Composition of relations.</p> <p><b>Functions:</b> Function or mapping, One-one Many-one, into and onto mappings, Identity mapping, constant mapping, Equality of mappings, Inverse of a mapping, Composition of mappings.</p>
Unit – III	<p><b>Boolean algebra :</b> Definition and properties of Boolean algebra, a brief introduction to the application of Boolean algebra to switching theory, conversion of complicated switching circuits to simple one, Disjunctive and Conjunctive normal forms.</p> <p><b>Graph Theory:</b> Introduction to graph theory, Paths and Circuits, Trees, Spanning trees, Cut-sets, Fundamental circuits and cut-sets.</p>
Unit – IV	<p><b>Matrices :</b> Introduction, Expression of complex numbers in the form of a matrix, De Moivre's theorem, Elementary transformations, Elementary matrices, Equivalent matrices, Properties of equivalent matrices, Sub-matrix of a matrix, Rank and Nullity of a matrix, Row equivalence and canonical form, Normal form of a matrix.</p>
Unit – V	<p>Solution of Homogeneous and Non-homogeneous system of linear equations, Characteristic roots and Characteristic vectors of a matrix, Caley-Hamilton theorem, to find the inverse of a non-singular matrix using Caley-Hamilton theorem.</p>

<b>Paper Code : BCA 201</b>	
<b>Name : Mathematics – II (Calculus)</b>	
Unit – I	<p><b>Review of concepts of function of one variable :</b></p> <p>Definition of a function, Types of Functions.</p> <p><b>Limits:</b> Definition, Working rule for finding out the limit, fundamental properties of limits, problems based on limits.</p> <p><b>Continuity:</b> Definition, Points of Discontinuity, Classification of Discontinuity, Problems based on Continuity &amp; Discontinuity.</p> <p><b>Differentiability:</b> Condition for Differentiability and problems.</p>
Unit – II	Rolles theorem First and Second Mean value theorems, Taylor's theorem, Successive differentiation, Leibnitz Theorem, Taylor's & Maclaurin's series, Intermediate forms.
Unit – III	Tangents, Normals, Curvature, Tests for Concavity and Convexity, Points of Inflexion, Multiple Points, Tracing of Curves in Cartesian and polar co-ordinates.
Unit – IV	Integration of rational and irrational algebraic functions and transcendental functions, reduction formulae.
Unit – V	Definite Integrals, Quadrature, Rectification, Volumes and surfaces of solids of revolution.



<b>Paper Code : BCA 202</b>	
<b>Name : DBMS</b>	
Unit – I	<b>Introductions:</b> Database system concepts, Data base system, Advantages of database systems; Data Architecture of data system: View/Schema, logical, conceptual and physical and their interrelationship DDL, DML and data dictionary, Data base administrator. Entity Relationship Model as a tool of conceptual design: Entities & Entity set, Relationship & Relationship set, Attributes, Mapping Constraints, Keys, Entity-Relationship diagram (E-R diagram): Strong & weak entities, Generalization, Specialization, Aggregation, Reducing ER diagram to tables.
Unit – II	Relational, Hierarchical and Network Model their advantages and disadvantages, storage organization for Relations. Rational Model: Structure tuple Attributes, Normalization: First, Second, Third & BCNF Normal Forms, Key, primary key, Candidate key, Integrity rules: Entity integrity, Referential integrity rule.
Unit – III	<b>Relational Algebra:</b> Select, Project, Cross product, Different types of joins i.e., theta join, equi join, natural join, outer join, set operations. Definition of union, set difference, Cartesian product, selection, intersection, Relational Query language.
Unit – IV	<b>Functional Protection and crash Recovery:</b> Protection against crashes: different types of crashes; Backup, Journal, Rollback, committed and uncommitted transactions, Security on database.
Unit – V	Transaction concept, Transaction state, serializability security or Database: user identification. Physical Protection and maintenance, Transmitted of Rights. Integrity: Integrity violation, Implementation of check's in enforcing integrity; Concept of Distributed database.

<b>Paper Code : BCA 203</b>	
<b>Name : Data Structure</b>	
Unit – I	<p>Introduction to data structure, Array, records, stacks Introduction to stack &amp; primitive operation on stack as an abstract data type, Multiple Stack, Stacks application: Infix, post fix, Prefix and Recursion.</p> <p><b>Queues:</b> Introduction to queues, Primitive Operations on the Queues, Queue as an abstract data type, Circular queue, Dequeue, Priority queue, Applications of queue.</p>
Unit – II	<p>Pointer &amp; linked allocation, linear, circular &amp; Doubly linked list, Operations on linked list , application of Linked list : Polynomial manipulation .</p>
Unit – III	<p><b>Tree:</b> General &amp; Binary tree. Conversion of General to binary tree. B<sup>+</sup> tree, traversal methods. In order, Preorder &amp; post order, Application of tree: Manipulation of arithmetic expression.</p>
Unit – IV	<p><b>Graph:</b> Graph &amp; their representations. Breadth first &amp; Depth first search. Spanning trees. Application of Graphs: PERT &amp; related techniques.</p>
Unit – V	<p>Introduction to file organization; Sequential, Indexed sequential, Relative &amp; Direct file organization. Searching: Linear &amp; Binary Search Sorting: Concept, selection sort, Bubble sort merge Sort, Tree sort &amp; Partition – Exchange sort.</p>

<b>Paper Code : BCA 204</b>	
<b>Name : Application Software Packages</b>	
Unit – I	<p><b>MS Windows:</b> Introduction to M.S. Windows; Features of Windows; Various versions of Windows &amp; its use; Working with Windows; My Computer &amp; Recycle bin; Desktop, Icons and Windows Explorer;</p> <p>Screen description &amp; working styles of Windows; Dialog Boxes &amp; Toolbars; Working with Files &amp; Folders; Shortcuts &amp; Auto starts; Accessories and Windows Settings using Control Panel; Start button &amp; Program lists; Installing new Hardware &amp; Software.</p>
Unit – II	<p><b>Basics of word:</b> Creating word documents; The word window, Entering Text, Editing Document text; Selecting Text, Copying and Moving Text. Applying Text Enhancements; Applying Fonts and Font Styles in Word, Highlighting Text For Distinctive Look. Aligning and Formatting; Aligning Text, Using Indentation Options, Setting Line Spacing Options, Using Tabs. Creating Lists, Numbers and Symbols; Numbering and Bullets, Creating Special Characters. Replacing and checking Text; Creating and Applying Frequently Used Text, Finding and Replacing Text, More about Spelling and Grammar, Using the Thesaurus Command. Getting Into Print; Using Print Preview, Changing Page Orientation and Paper Size, Aligning Text Vertically, Setting Margins, Printing Options.</p> <p><b>Advanced Formatting Techniques in Word:</b></p> <p>Formatting Pages; Formatting Sections, Creating and Modifying Page Numbers, Creating Headers and Footers, Taking Care of Loose Ends, Working With Columns; Working With Newspaper Columns, Revising Column Structure. Constructing High-Quality Tables; Creating and Revising Tables, Modifying Table Structure, Formatting Tables, Using Tables Calculatingly. Working Smarter with Word; Using Templates. Creating Outlines in Word; Creating an Outline, Modifying an Outline.</p>
Unit – III	<p><b>Access:</b> Concepts &amp; terms : database tables, relational databases, records, fields, controls &amp; objects, queries &amp; dynasets, forms, reports, properties, wizards, macros, Access requirements, starting &amp; quitting access, the access workspace &amp; tool, views.</p> <p>Creating database &amp; tables with &amp; without wizard, field name, data types &amp; properties, adding &amp; deleting fields in fields, renaming fields &amp; their caption, resizing fields, freezing columns, primary key field &amp; indexing fields.</p> <p><b>Form:</b> Form wizard, saving &amp; modifying forms: Entering &amp; Editing data, Finding, sorting &amp; displaying data, queries &amp; dynasets, creating &amp; using select queries, using wild cards in queries, reformatting dynasets.</p> <p><b>Reports:</b> Creating reports, previewing reports, printing reports, modifying, saving. Relational databases – definition, purpose, creation, viewing, deleting, Expressions, Macros.</p>
Unit – IV	<p><b>Creating Excel Worksheets:</b> Entering and Editing Cell Entries; The excel Application Window, Workbooks and Worksheets, Moving the Cell Pointer, Entering Text and Numbers, Revising Text and Numbers. Working with Numbers; Creating Formulas, Formatting numbers. Changing Worksheet</p>

	<p>Layout; Adjusting Column Width and Row Height, Inserting and Deleting Rows and Columns, Inserting and Deleting Cells, Moving and Copying Cell Contents, Naming a Worksheets, Selecting Worksheets, Copying and Moving Worksheets, Inserting and Deleting Worksheets, Other Formatting Options; Aligning Text, Border and Color. Printing in Excel; Print Preview, Changing Page Setup, Checking Worksheet Spelling.</p> <p><b>Advanced Techniques in Excel</b> : Using Functions and References; Using Functions, Entering Functions, Relative and Absolute Cell References. Naming Ranges, Using Names, Creating Easy-to-Understand Charts; Pie Charts, Series Charts, Creating Charts, Moving, Sizing and Printing Chart Objects. Edition and Formatting Charts; Adding a Data Series, Deleting a Data Series, Modifying and Formatting Charts.</p>
Unit – V	<p><b>Creating Power Point Presentations:</b> Creating a Basic Presentation, Building Presentations, Modifying Visual Elements, Formatting and Checking Text, Adding Objects, Applying Transitions, Animation Effects and Linking, Preparing handouts, Taking the Show on the Road.</p>

<b>Paper Code : BCA 205</b>	
<b>Name : ENVIRONMENTAL AWARENESS</b>	
<b>OBJECTIVE:</b> To Introduce the concept of Environmental Awareness.	
Unit – I	Environment meaning, structure and type of environment components of environment and society environment and resources. Man Environment relationship; Approach to study, man Interaction; with environment (historical to present day).
Unit – II	<b>Environment Degradation:</b> Meaning of degradation, types of degradation, process of degradation, cause of degradation, Religious and Philosophical factors deforestation agricultural development and degradation population growth and Degradation, urbanization and degradation, Modern technology And degradation.
Unit – III	<b>Ecology:</b> Definition of ecology and ecosystem. Types of Ecosystem, components of ecosystem functions of ecosystem Productivity and stability of ecosystems. Environmental Disasters: Meaning and concepts, types of hazards and disaster, man induced and natural regards, global warning, ozone depletion, green house effect and other major Environmental problems.
Unit – IV	<b>Environmental Pollution:</b> Air, water, solid, noise pollution Meaning, definition, sources, types, adheres effects and methods of control.
Unit – V	<b>Environmental Planning and Management:</b> Concepts, aspects and Approaches, resources management, Ecological Mgt. Biosphere Reserves, Management of wild life. Environmental Regulation and Rules: Vision of environment by Govt. of India, Environmental Policy, waste disposal rules and laws and legislation enacted by Parliament for environmental protection.