MANGALORE UNIVERSITY

Revised Syllabi for

Bachelor of Computer Applications (BCA) Degree Course

Credit Based Semester System
(2012-13 onwards)

MANGALORE UNIVERSITY

Bachelor of Computer Applications (B.C.A) Course Pattern and Scheme of Examinations

I SEMESTER BCA

Subject Code	Subject	Theory Hours/ Week	Practical Hours/ Week	Duration of exams (Hrs)	Marks & Credits			
					IA	Exam	Total	Credits
BCA101	Language-I	4	-	3	20	80	100	2
BCA102	Language-II	4	-	3	20	80	100	2
BCA103	Fundamentals of Information Technology	4	-	3	20	80	100	2
BCA104	Programming in C	4	-	3	20	80	100	2
BCA105	Computer Organization	4	-	3	20	80	100	2
BCA106	FIT Lab	-	6	3	20	80	100	2
BCA107	C Programming Lab	-	6	3	20	80	100	2
BCA108	General Studies	4	-	3	-	100	100	2
BCA109	CC & EC	-	-	-	50	-	50	1
	Total	24	12		190	660	850	17

II SEMESTER BCA

Subject Code	Subject	Theory Hours/ Week	Practical Hours/ Week	Duration of exams (Hrs)	Marks & Credits			
					IA	Exam	Total	Credits
BCA201	Language-I	4	-	3	20	80	100	2
BCA202	Language-II	4	-	3	20	80	100	2
BCA203	Basics of Networking	4	-	3	20	80	100	2
BCA204	Object Oriented Programming using C++	4	-	3	20	80	100	2
BCA205	Database Concepts and Oracle	4	-	3	20	80	100	2
BCA206	C++ Programming Lab	-	6	3	20	80	100	2
BCA207	Oracle Lab	-	6	3	20	80	100	2
BCA208	General Studies	4	-	3	-	100	100	2
BCA209	CC& EC	-	-	-	50	-	50	1
	Total	24	12		190	660	850	17

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Bachelor of Computer Applications (B.C.A) Course Pattern and Scheme of Examinations

III SEMESTER BCA

Subject Code	Subject	Theory Hours/ Week	Practical Hours/ Week	Duration of exams (Hrs)	Marks & Credits			
					IA	Exam	Total	Credits
BCA301	Basic Mathematics	4	-	3	20	80	100	2
BCA302	Microprocessors	4	-	3	20	80	100	2
BCA303	Data Structures	4	-	3	20	80	100	2
BCA304	Operating System	4	-	3	20	80	100	2
BCA305	Data Mining	4	-	3	20	80	100	2
BCA306	Microprocessor Lab	-	6	3	20	80	100	2
BCA307	Data Structure & OS Lab	-	6	3	20	80	100	2
BCA309	CC & EC	-	-	-	50	-	50	1
	Total	20	12		190	560	750	15

IV SEMESTER BCA

Subject Code	Subject	Theory Hours/ Week	Practical Hours/ Week	Duration of exams (Hrs)	Marks and Credits			
					IA	Exam	Total	Credits
BCA401	Computer Graphics and Multimedia	4	-	3	20	80	100	2
BCA402	Visual Basic .NET Programming	4	-	3	20	80	100	2
BCA403	Principles of TCP/IP	4	-	3	20	80	100	2
BCA404	E-Commerce	4	-	3	20	80	100	2
BCA405	Elective Stream-I: E1.1 E1.2 E1.3	4	-	3	20	80	100	2
BCA406	Computer Graphics Lab	-	6	3	20	80	100	2
BCA407	VB.Net Lab	-	6	3	20	80	100	2
BCA409	CC & EC	-	-	-	50	-	50	1
	Total	20	12		190	560	750	15

BCA405 - Elective Stream-I:
> E1.1: Computer Oriented Numerical Analysis
> E1.2: Computer Oriented Statistical Methods
> E1.3: System Analysis and Design

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V SEMESTER BCA

Subject Code	Subject	Theory Hours/ Week	Practical Hours/ Week	Duration of exams (Hrs)	Marks & Credits			
					IA	Exam	Total	Credits
BCA501	Software Engineering	4	-	3	25	100	125	2.5
BCA502	Linux Environment	4	-	3	25	100	125	2.5
BCA503	Web Development in .NET	4	-	3	25	100	125	2.5
BCA504	Java Programming	4	-	3	25	100	125	2.5
BCA505	Distributed Computing	4	-	3	25	100	125	2.5
BCA506	Elective Stream-II E.2.1: E.2.2: E.2.3:	4	-	3	25	100	125	2.5
BCA507	Web Technology Lab	-	6	3	25	100	125	2.5
BCA508	DC & Java Lab	-	6	3	25	100	125	2.5
	Total	24	12		200	800	1000	20

BCA-505: Elective Stream-II:
        E.2.1: Artificial Intelligence
        E2.2 : Management Information System
        E2.3 : LAMP Technology

VI SEMESTER BCA

Subject Code	Subject	Theory Hours/ Week	Practical Hours/ Week	Duration of exams (Hrs)	IA	Theory Exam	Total Marks	Credits
BCA-601	Project Work /Dissertation	-	36	-	160	400 (Project Report) 240 (Viva)	800	16
	Total		36		160		800	16

    Total Marks   : 5000

    Total Credits : 100

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					IA	Exam	Total	Credits
BCA101	Language-I	4	-	3	20	80	100	2
BCA102	Language-II	4	-	3	20	80	100	2
BCA103	Fundamentals of Information Technology	4	-	3	20	80	100	2
BCA104	Programming in C	4	-	3	20	80	100	2
BCA105	Computer Organization	4	-	3	20	80	100	2
BCA106	FIT Lab	-	6	3	20	80	100	2
BCA107	C Programming Lab	-	6	3	20	80	100	2
BCA108	General Studies	4	-	3	-	100	100	2
BCA109	CC & EC	-	-	-	50	-	50	1
	Total	24	12		190	660	850	17

PAPER-I	**BCA103: FUNDAMENTALS OF INFORMATION TECHNOLOGY**	**48 hours**
Theory/Week: 4 Hrs **Credits: 2**		**I A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

Introduction to Computers: Introduction, Characteristics computers, Evolution computers Generation of computers, Classification of computers, the computer system, Application of computers

Computer Architecture: Introduction, Central processing unit, main memory unit, interconnection of units, cache, communication between various units of a computer system

Primary memory: Introduction, memory representation, memory hierarchy, Random access memory, Types of RAM, Read-only memory, Types of ROM.

	UNIT-II	**12 Hrs.**

Secondary Storage: Introduction, classification, magnetic tape, magnetic disk, Optical disk, Magneto-optical disk, Memory stick, Universal serial bus, Mass storage devices.

Input devices: Introduction, Types of input devices, Optical character recognition, Optical Mark Recognition, Magnetic ink character recognition, Bar code reader,

Output devices: Introduction, Types of output, Classification of output devices, Terminals.

	UNIT-III	**12 Hrs.**

Computer Program: Introduction, algorithm, flowchart

Computer languages: Introduction, Evolution of programming languages, classification of programming languages, generation of programming languages, Features of a good programming language, selection of a programming language.

Computer software: Introduction, software definition, relationship between software and hardware, software categories, terminology software

Internet basics: Introduction, Evolution, Basic internet terms, getting connected to internet, internet applications

	UNIT-IV	**12 Hrs.**

MS Windows and MS Office: Microsoft Windows XP, Overview of Microsoft Windows 7, Introduction to Microsoft Office 2007, Microsoft Word 2003, Microsoft Excel 2003, Microsoft PowerPoint 2003, Microsoft Access 2003

Text Books:

ITL Education Solution Limited, **Introduction to Information Technology**, Pearson Education, 2012.

Reference Books:

1. Peter Norton, **Introduction to Computers**, 7th edition, Tata McGraw Hill Publication, 2011
2. Anita Goel, **Computer Fundamentals**, Pearson Education, 2011.
3. Saxena S, **MS Office 2007 in A Nutshell**, Vikas Publishing, 2011
4. Vikas Gupta, **MS OFFICE 2007**, Wiley

PAPER-II	BCA104: COMPUTER ORGANISATION	48 hours
Theory/Week: 4 Hrs **Credits: 2**		**I.A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**
Digital Computer System: Introduction to Number system, Decimal number, Binary number, Octal and Hexadecimal numbers, Number base conversion, Complements, Binary codes, Binary logic, Integrated Circuits, Binary arithmetic's, Addition and Subtraction in the 1's and 2's complement system, Addition and Subtraction in the 9's and 10's complement system. Boolean algebra :Basic definitions, Axiomatic definition of Boolean algebra, Basic theorems and properties of Boolean algebra, Venn diagram.		
	UNIT-II	**12 Hrs.**
Digital logic gate : Boolean functions, Canonical and Standard forms, other logic operations, Digital logic gates, Universal gate. Simplification of Boolean function: The map method, Two and three variable maps, Four - variable maps, Don't Care conditions, Product of sum Simplification, NAND implementation, NOR implementation. Implementation of EX-OR, EX-NOR using NAND and NOR gate.		
	UNIT-III	**12 Hrs.**
Adder and Subtractor : Half Adder, Full Adder, Half Subtractor, Full Subtractor, Binary parallel adder, BCD adder. Combinational Logic: Some common combinational circuits used in digital systems. Code converter, Exclusive-OR and Equivalence functions. Magnitude comparator, Decoders, Encoders, Multiplexers, Demultiplexers.		
	UNIT-IV	**12 Hrs.**
Sequential Logic : Introduction, Flip flops, RS-FF, D-FF. T-FF, and JK-FF. Triggering of flip-flops, Master slave Flip flop, state table, and State diagram. State equations, Flip Flop excitation tables, Sequential circuits design. Registers, Counters: Synchronous Counters design using RS, JK, D, & T flip flops. Ripple counters Introduction, Registers, Shift registers, Timing sequences, Bidirection shift register.		
Text Book M.Morris Mano, **Digital Logic and Computer Design**, PHI		

Reference Books
    1. Thomas L Floyd, **Digital Fundamentals**, 10th Edition, Pearson, 2011.
    2. Thomas .C. Bartee, **Digital Computer Fundamentals**, 6th edition, TMH		

PAPER-III	**BCA105: PROGRAMMING IN C**	**48 hours**
Theory/Week: 4 Hrs **Credits: 2**		**I.A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

Introduction: Overview of C Program, Importance of C Program, Basic structure of a C-program, Execution Style of C Program. **Constants, Variables & Data types**: Features of C language, Character set, C token, Keywords & identifiers, Constants, Variables, data types, Declaration of variables, assigning values to variables, defining symbolic constants. **Operators and Expression**: Arithmetic, Relational, logical, assignment, increment & decrement, conditional, bit wise & special operators, evaluation of expressions, Precedence of arithmetic operators, type conversions in expressions, operator precedence & Associativity, built in mathematical functions. **Managing Input and Output operations**: Reading & writing a character, Formatted input and output.

	UNIT-II	**12 Hrs.**

Decision Making and Branching: Decision making with if statement, simple if statement, the if else statement, nesting of if … else statements, the else if ladder, the switch statement, the ?: operator, the go to statement. **Decision making and looping**: The while statement, the do statement, for statement, exit, break, jumps in loops. **Arrays**: Declaration, initialization & access of one dimensional & two dimensional arrays. Programs using one and two dimensional arrays. : Adding multiplying, transposing matrices, sorting and searching arrays.

	UNIT-III	**12 Hrs.**

Handling of character strings: Declaring & initializing string variables, reading strings from terminal, writing strings to screen, Arithmetic operations on characters, putting strings together, comparison of two strings, string handling functions, table of strings. **User defined functions**: Need for user defined functions, Declaring, defining and calling C functions return values & their types, Categories of functions: With/without arguments, with/without return values, recursion, functions with arrays, the scope, visibility & lifetime of variables.

	UNIT-IV	**12 Hrs.**

Structures and union: Structure definition, giving values to members, structure initialization, comparison of structure variables, arrays of structures, arrays within structures, structures within structures, structures & functions, unions, size of structures, bit fields. **Pointers**: Understanding pointers, accessing the address of a variable, declaring & initializing pointers, accessing a variable through its pointer, pointer expression, pointer increments & scale factor, pointers & arrays, Passing pointer variables as function arguments.
The Preprocessor: Macro substitution, file inclusion, compiler control directives, command line arguments & illustrative programs. **File Management in C:** Introduction, defining and opening a file, closing a file, I/O operations on files, error handling during I/O operations.

Text Book:
   E. Balagurusamy, **Programming in ANSI C**, 5th Edition, Tata McGraw Hill.

Reference Book:
   1. K.R. Venugopal and Sudeep R Prasad, **Programming with C**, 4th Edition, Tata McGraw-Hill Education.
   2. Yashavant P. Kanetkar, **Let Us C**, 10th Edition, Tata McGraw Hill, 2010.

Practical

Practical-I	CS106 : FIT Lab	72 hours
Practical/Week: 6 Hrs Credits: 2	Exercises in MS Office	I.A: 20 Exam: 80

Practical-II	CS107 : C Programming Lab	72 hours
Practical/Week: 6 Hrs Credits: 2	Programming exercises in C	I.A: 20 Exam: 80

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					IA	Exam	Total	Credits
BCA201	Language-I	4	-	3	20	80	100	2
BCA202	Language-II	4	-	3	20	80	100	2
BCA203	Basics of Networking	4	-	3	20	80	100	2
BCA204	Object Oriented Programming using C++	4	-	3	20	80	100	2
BCA205	Database Concepts and Oracle	4	-	3	20	80	100	2
BCA206	C++ Programming Lab	-	6	3	20	80	100	2
BCA207	Oracle Lab	-	6	3	20	80	100	2
BCA208	General Studies	4	-	3	-	100	100	2
BCA209	CC& EC	-	-		50	-	50	1
	Total	24	12		190	660	850	17

PAPER-IV	BCA203: BASICS OF NETWORKING	48 hours
Theory/Week: 4 Hrs **Credits: 2**		**I.A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**
Introduction to Networks: Overview of Networking, Network communication standards **Network Topologies**: Overview of Network Topologies, Basic topologies, complex topologies **LAN Components**: LAN Cables and connectors, LAN devices, Wireless LANs		
	UNIT-II	**12 Hrs.**
LAN Protocols: Lower-layer Protocols, Middle-layer Protocols, Higher-layer Protocols, **Network Addressing** - Introduction, TCP/IP Addressing scheme, IPX/SPX addressing, NETBEUI addressing		
	UNIT-III	**12 Hrs.**
Introduction to WAN: Overview, WAN connectivity options, virtual private networks **WAN hardware and protocols**: WAN devices, WAN Protocols		
	UNIT-IV	**12 Hrs.**
Network Operating Systems: Windows 2000 server, Novel Netware **Windows 2000 server**: Active directory, Internet tools and services		
Text Book: NIIT, **Basics of Networking**, PHI Learning Private ltd, 2010		

Reference Books
    1. Behrouz A. Forouzan, **Data Communications and Networking**, 4th Edition, Tata Mcgraw Hill
    2. Andrew S Tanenbaum, **Computer Networks**, 4th edition, Dorling Kindersley Pvt Ltd
    3. James Chellis, et al., **MCSE: Networking Essentials Study Guide**, 3rd edition, BPB		

PAPER-V	**BCA204: OBJECT ORIENTED PROGRAMMING USING C++**	**48 hours**
Theory/Week: 4 Hrs **Credits: 2**		**I.A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

Principles of Object Oriented programming: Basic Concepts, benefits, application.
Beginning with C++: Program features, comments, cin, cout, return statement, Structure of a C++ program.
Tokens, expressions and control structures: Tokens, keywords, identifiers, basic and derived data types, symbolic constants, declaration of variables, dynamic initialization of variables, reference variables, the operators::, ::*, .*, delete, endl, new, setw. Typecast operator, expression and implicit conversions, operator precedence, control structures – while, do-while, if, and switch.

	UNIT-II	**12 Hrs.**

Functions in C++: main function, Prototyping, call and return by reference, inline functions, default arguments, const arguments, function overloading, mathematical functions **Classes and objects:** structures, specifying a class, creating objects, accessing class members, defining member functions, making outside functions inline, nesting of member functions, private member functions, arrays within a class, memory allocation for objects, static data members, static member functions, arrays of objects, objects as function arguments, friends functions, returning objects, const member functions, pointers to members.

	UNIT-III	**12 Hrs.**

Constructors and destructors: Parameterized constructors, multiple constructors, constructors with default arguments, dynamic initialization of objects, copy constructor, dynamic constructors, constructing two dimensional arrays, const object, destructors, memory allocation to an object using destructor
 Operator overloading: defining, overloading unary and binary operators, overloading binary operators using friend functions, manipulation of strings using operator overloading, rules for overloading operators, type conversions – basic to class, class to basic, one class to another class.

	UNIT-IV	**12 Hrs.**

Inheritance: Defining a derived class, single inheritance, protected members, multilevel inheritance, multiple inheritance, hierarchical inheritance, hybrid inheritance, virtual base classes, abstract classes, constructors in derived classes, nesting of classes. **Pointers, virtual functions, polymorphisms:** Pointers to objects, this pointer, pointers to derived classes, virtual functions, pure virtual functions, virtual constructors and destructors.

Text Book:
>   E Balagurusamy, **Object Oriented Programming with C++**, 5th Edition, Tata McGraw hill
>   Publication.

Reference Books:
1. D Ravichandran, **Programming with C++**, Third Edition, McGraw hill 2011
2. Robert Lafore, **Oriented Programming in C++**, Galgotia Publications Pvt. Ltd, 2006.

PAPER-VI	BCA205 : DATABASE CONCEPTS AND ORACLE	48 hours
Theory/Week: 4 Hrs **Credits: 2**		**I.A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

Introduction to Database System Concepts and Architecture.

Databases and Database Users: Introduction, an example, Characteristics of the Database Approach, Users, Advantages of Using a DBMS Approach, when not to use a DBMS. **Database System concepts and architecture** : Data Models, Schemas, and Instances, Three-schema architecture and Data Independence, Database Languages and Interfaces, The Database System Environment, Classification of Database Management Systems. **Data Modeling Using the Entity-Relationship Model** : High-Level Conceptual Data Models for Database Design, An example database application, Entity Types, Entity Sets, Attributes and Keys, Relationships, Relationship Types, sets, roles, and Structural Constraints, Weak Entity Types**,** ER Diagrams, Naming Conventions, and Design Issues.

	UNIT-II	**12 Hrs.**

Relational Data Model, Relational Constraints, and Relational Algebra: Relational Model Concepts, Relational model Constraints and Relational Database Schemas, Update Operations, transactions and Dealing with Constraint Violations **Relational Algebra and Relational Calculus**: Unary relational algebra Operations : SELECT and PROJECT, Relational Algebra operations from Set theory, Binary relational operations - JOIN and DIVISION, Additional Relational Operations, Examples of Queries in Relational Algebra.

Functional dependencies and Normalization for Relational databases: Functional dependencies, Normal Forms based on primary keys, General definitions of second and third normal forms, Boyce-Codd Normal form.

Disk Storage, basic file structures and Hashing: Secondary storage devices, Buffering of Blocks, Placing File Records on Disk, Operations on Files, Files of Unordered Records (Heap Files), Files of Ordered Records (Sorted Files), Hashing Techniques. Other primary file organizations, parallelizing disk access using RAID technology, New storage systems.

	UNIT-III	**12 Hrs.**

SQL-The Relational Database Standard : Oracle and Client – Server Technology, Data manipulation in DBMS, Data types, SQL commands: Create Table, Inserting data, SELECT, DELETE, UPDATE, ALTER TABLE, DROP TABLE, RENAME, DESCRIBE. (Explain with syntax and examples) Computations on table data, DUAL, SYSDATE, UNION,INTERSET MINUS CLAUSE ORACLE functions, DATA constraints on table, USER_CONSTRAINT TABLE, defining and dropping Integrity constraint in ALTER TABLE, Default value concepts, GROUP By, HAVING, ORDER BY, Sub queries, Joins, Security management using SQL

	UNIT-IV	**12 Hrs.**

Introduction to PL/SQL, Oracle Transactions, CURSORS, Parameterized cursors, Oracle named Exception handlers, Stored Procedures and functions, Oracle Package, Database triggers, RAISE_APPLICATION ERROR PROCEDURE, Generation of primary key using a Database Triggers.

Text Books:
1. Ramez Elmasri and Shamkanth B.Navate, **Fundamentals of Database Systems**, 5th Edition, Pearson Education
2. Ivan Bayross, **SQL/PL/SQL- the Programming language of Oracle**, 2nd Revised edition (or 4th revised Ed), BPB Publications

Reference Books:
1. Abraham Silberschatz, Henry Korth and S. Sudarshan, **Database Systems Concepts**, 3rd edition, McGraw Hill International Editions.
2. C J Date, **Introduction to Database systems**, Addison-Wesley.
3. Jeffrey D. Ullman, **Principles of Database Systems**, Computer Science Press, 1984.

Practical

Practical-III	BCA106 : C++ Programming Lab	72 hours
Practical/Week: 6 Hrs Credits: 2	Object Oriented Programming exercises in C++	I.A: 20 Exam: 80

Practical-IV	BCA107 : Oracle Lab	72 hours
Practical/Week: 6 Hrs Credits: 2	Database query and PL/SQL programming exercises	I.A: 20 Exam: 80

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BCA304	Operating System	4	-	3	20	80	100	2
BCA305	Data Mining	4	-	3	20	80	100	2
BCA306	Microprocessor Lab	-	6	3	20	80	100	2
BCA307	Data Structure & OS Lab	-	6	3	20	80	100	2
BCA309	CC & EC	-	-	-	50	-	50	1
	Total	20	12		190	560	750	15

PAPER-VII	BCA301: BASIC MATHEMATICS	48 hours
Theory/Week: 4 Hrs **Credits: 2**		**I.A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

Algebra:
Logarithms- Introduction, Definition, Laws of operations, change of base
Permutations and combinations **Binomial theorems**-Introduction, Binomial theorem, Position of terms.
Analytical geometry: Introduction, distance between two points, Section formula, external division, coordinates of a centroid, Area of a triangle.
The straight line – slope of a straight line, different forms of equations of the straight line.
Circle -The equation of a circle, different forms of circles, General equation of the circle, equation of tangent to the circle, **Ellipse**

	UNIT-II	**12 Hrs.**

Trigonometry: Introduction, Measurement of angles, trigonometric functions, relation between trigonometric functions, signs of trigonometric functions, trigonometric functions of standard angles.
Calculus: Limit of function, continuity of a function.
Differentiation: Derivative of a function of one variable, Power function, constant with a function, sum of functions, product of two functions, quotient of two functions.
Integration- Indefinite integral, rules of integration, some standard results and examples, definite integral.

	UNIT-III	**12 Hrs.**

Set theory: Basic concepts of Set theory, notation, Inclusion and Equality of sets, The power set, some operations on sets, Venn diagrams, ordered pairs, n-tuples, Cartesian products.
Relations: Relations, properties of binary relations in a set, relation matrix and the graph of a relation, equivalence relations, compatibility relations, composition of binary relations, partial ordering, partially ordered set
Functions: Definition and Introduction, composition of functions, Inverse functions, Binary and n-ary operations, characteristic function of a set.

	UNIT-IV	**12 Hrs.**

Graph theory:
Basic definition, Path, reachability and connectedness, Matrix representation of graph, Trees.

Text Books :
1. D.C. Sanchethi & V.K. Kapoor, **Business Mathematics**, 11th edition, Sulthan Chand & sons.
2. JP Tremblay, R Manohar, **Discrete Mathematical Structures with Applications to Computer Science**, 3rd edition, Tata McGraw Hill publication

Reference books:
1. Padmalochan Hazarika, **A Textbook of Business Mathematics**, 2nd Edition, S. Chand Publishing, 2010
2. Ross Sharon Cutler, Kolman, Bernard, **Discrete Mathematical Structures**, Phi Learning, 2008

PAPER-VIII	**BCA302: MICROPROCESSORS**	**48 hours**
Theory/Week: 4 Hrs **Credits: 2**		**I A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**
Introduction and architecture of 8086: Historical evaluation of microprocessors, Microprocessor based computer system, Computer data formats. Internal Microprocessor architecture, The programming model, Different types of registers, flags, segment registers, Assembler directives.		
	UNIT-II	**12 Hrs.**
Addressing Modes: Data Movement Instructions, Register, Immediate, Direct, Register indirect, Base plus Index, register relative, base relative plus index addressing modes with examples. Program memory-addressing modes, Stack memory-addressing modes, segment override prefix. MOV instruction - various types, Push, Pop, LEA, LDS, LES, string data transfer instructions.		
	UNIT-III	**12 Hrs.**
Introduction Sets: Miscellaneous data transfer instructions, Arithmetic and Logic instructions and branching instructions. Miscellaneous data transfer instructions - XCHG, XLAT, IN and OUT. Add, Subtract, Multiply and Divide instructions, comparison instruction, BCD and ASCII arithmetic, Basic logic instructions, Shift and Rotate, String comparison instructions. Jump - various types (conditional and un-conditional), Loop, Do-while and Repeat until loops in MASM 6.x		
	UNIT-IV	**12 Hrs.**
Procedures, interrupts and microcontrollers: Procedures and parameter passing CALL and RET instructions. Introduction to interrupts, interrupt vectors, interrupt instructions, controlling the carry flag bit, WAIT, HLT, NOP, LOCK, ESC, BOUND, ENTER and LEAVE. **Introduction and overview of microcontrollers**.		

Text Books:
    1. Barry B. Brey, **Intel Microprocessors**, 6th edition, PHI.
    2. KR Venugopal and Rajkumar, **Microprocessor X86 programming**, BPB publications.
    3. Udayashankar, et al, **Microcontroller**, Tata McGraw Hill		

Reference Books:
    1. David E Goldberg Jacqueline, **Schaum's Outline of Theory and Problems of Programming With Assembly Language**, Mcgraw-Hill
    2. D.V.Hall, **Microprocessors and Interfacing**, Tata McGraw Hill.
    3. Yu Cheng Liu and Glen A. Gibson, **Microcomputer systems: The 8086/8088 family – architecture, programming**, PHI		

PAPER-IX	BCA303 : DATA STRUCTURES	48 hours
Theory/Week: 4 Hrs **Credits: 2**		**I A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

Introduction and overview: Introduction, basic terminology, data structure, data structure operation, abstract data types.
Preliminaries: Introduction, mathematical notations and functions, algorithmic notation
String Processing: Introduction, basic terminology, storing strings, character data types, strings as ADT
Arrays: Introduction, linear arrays, arrays as ADT, Representation of linear arrays in memory, traversing linear arrays, inserting and deleting, sorting, searching, multi dimensional arrays, representation of polynomials using arrays, matrices, sparse matrices

	UNIT-II	**12 Hrs.**

Linked list: Introduction, linked list, representation of linked list in memory, traversing a linked list, searching in linked list, memory allocation; garbage collection, insertion into a linked list, deletion from a header linked list, circular ly linked list, doubly linked list
Sorting and searching: Introduction, sorting, insertion sort, selection sort, merge sort, shell sort, radix sort; searching

	UNIT-III	**12 Hrs.**

Stacks, queues and recursion: Introduction, stacks, array representation of stacks, linked representation of stacks, stack as ADT, arithmetic expressions: Polish notations, application of stacks, recursion, implementation of recursive procedure by stack, Queues, linked representation of queues, queue as ADT, circular queues, Dqueue, Priority queue, application of queues.

	UNIT-IV	**12 Hrs.**

Trees: Introduction, binary trees, representing binary trees in memory, traversing binary trees, traversal algorithm using stacks, header nodes: Threads, threaded binary search trees, searching and inserting in binary search trees, deleting in binary search tree, balanced binary trees
Graphs and their applications: Introduction, graph theory terminology, sequential representation of graphs: adjacency matrix: Path matrix, Linked representation of a graph, operations on graphs, traversing a graph.

Text Book:
Seymour Lipshutz, **Schaum's Outline : Data Structures with C**, Tata McGraw Hill, 2011

Reference Books:
1. Yedidyah Langsun, Moshe J. Augenstein, Tennebaum, **Data structures using C & C**++, Prentice Hall of India ltd.
2. J.P. Trembly and Sorenson, **An Introduction to Data 'Structures with Applications,** 2nd edition, McGraw Hill, 2001.

PAPER-X	BCA304 : OPERATING SYSTEM	**48 hours**
Theory/Week: 4 Hrs **Credits: 2**		**I A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

Introduction : Operating System, Simple Batch Systems, Multi programmed Batched Systems, Time Sharing Systems, Real-Time Systems, System Components, Operating System Services
Process : Process Concept, Process Scheduling, Cooperating Process, Threads(Thread Concept, Single and Multiple Threads, Benefits) **:*CPU Scheduling:*** Basic Concepts, Scheduling Criteria, Scheduling Algorithms.

	UNIT-II	**12 Hrs.**

Process Synchronization. The Critical Section Problem, Semaphores (The Classical Definition of Wait & Signal, Binary Semaphores) Classical Problems of Synchronization. *Deadlocks:* Deadlock Characterization, Methods of Handling Deadlocks, Deadlock Prevention, Deadlock Avoidance, Deadlock Detection, Recovery from Deadlock.

	UNIT-III	**12 Hrs.**

Memory Management. Logical versus Physical Address Space, Swapping, Contiguous Allocation (Memory Allocation, Fragmentation), Paging(Basic Method, Hardware Support),
Segmentation (Basic Method, Hardware). *Virtual Memory.* Demand Paging, Page Replacement, Page Replacement Algorithms, Allocation of Frames (Equal and Proportional Allocation), Thrashing(concept)
File System. File Concept, Access Methods, Directory Structure, File System Structure, Allocation Methods, Free-Space Management, Protection of File System.

	UNIT-IV	**12 Hrs.**

Unix: An introduction, Features of Unix, Unix system organization, Unix file system
Linux: An introduction, reason for its popularity, Linux file system, login and logout.
Linux commands: Command format, Directory oriented command, wild card characters, File oriented commands, File Access Permissions, Process oriented commands, Background processing, Communication oriented commands, General purpose commands, Pipe and Filters related commands, vi editor, Shell programming, System administration.

Text Books:
1. Abraham Silberschartz and Peter Galvin, **Operating System Concepts**, 6th edition, TMH
2. B Mohammed Ibrahim, **Linux: A Practical Approach**, FireWall Media, 2009

Reference books:
1. Andrew S Tanenbaum, **Operating System Design and Implementation**, PHI
2. Milan Milenkovic, **Operating Systems**, TMH
3. Cristopher Negus, Dreamtech, **Red Hat Linux 9 Bible**, Wiley Publication

PAPER-XI	BCA305 : DATA MINING	48 hours
Theory/Week: 4 Hrs Credits: 2		I A: 20 Exam: 80
	UNIT-I	12 Hrs.

INTRODUCTION : Introduction, Data Mining as a Subject
DATA WAREHOUSING Introduction, Definition, Multidimensional Data Model, OLAP Operations, Warehouse Schema, Data Warehousing Architecture, Warehouse Server, Metadata, OLAP Engine, Data Warehouse Backend Process, Other Features
DATA MINING Introduction, Data Mining Definitions, KDD vs. Data Mining, DBMS vs. DM, Other Related Areas, DM Techniques, Other Mining Problems, Issues and Challenges in DM, DM Application Areas, DM Applications-Case Studies

	UNIT-II	12 Hrs.

ASSOCIATION RULES Introduction, Association Rule, Methods to Discover Association Rules, Priori Algorithm, Partition Algorithm, Pincer-Search Algorithm, Dynamic Itemset Counting Algorithm, FP-tree Growth Algorithm.
CLUSTERING TECHNIQUES Introduction, Clustering Paradigms, Partitioning Algorithms, k-Medoid Algorithms, CLARA, Hierarchical Clustering, DBSCAN, Categorical Clustering Algorithms, STIRR.

	UNIT-III	12 Hrs.

DECISION TREES   Introduction, Decision Tree, Tree Construction Principle, Best Split, Splitting Indices, Splitting Criteria, Decision Tree Construction Algorithms, CART, ID3
ROUGH SET THEORY Introduction, Definition, Example, Rough Sets and Fuzzy Sets.
OTHER TECHNIQUES Introduction, Neural Network, Learning in NN, Unsupervised Learning, Data Mining using NN: A Case Study, Genetic Algorithm, Support Vector Machines.

	UNIT-IV	12 Hrs.

WEB MINING Introduction Web Mining, Web Content Mining, Web Structure Mining, Web Usage Mining, Text Mining, Unstructured Text, Episode Rule Discovery for Texts, Hierarchy of Categories Text Clustering
TEMPORAL AND SPATIAL DATA MINING Introduction, Temporal Data Mining, Temporal Association Rules, Sequence Mining, The GSP Algorithm, Episode Discovery, Event Prediction Problem, Time-Series Analysis, Spatial Mining

Text Book:
   Arun K Pujari, **Data Mining Techniques**, 2nd Edition, Universities Press India, 2010.

Reference Book:
   Jiawei Han, Micheline Kamber, **Data Mining Concepts And Techniques**, 3nd Edition, Elsevier, 2010.

Practical

Practical-V	BCA306 : Microprocessor Lab	72 hours
Practical/Week: 6 Hrs Credits: 2	8086 Assembly Programming	I.A: 20 Exam: 80

Practical-VI	BCA307 : Data Structures & OS Lab	72 hours
Practical/Week: 6 Hrs Credits: 2	Implementing data structures using C++ and Linux Shell programming	I.A: 20 Exam: 80

MANGALORE UNIVERSITY

Bachelor of Computer Applications (B.C.A) Course Pattern and Scheme of Examinations

IV SEMESTER BCA

Subject Code	Subject	Theory Hours/ Week	Practical Hours/ Week	Duration of exams (Hrs)	Marks and Credits			
					IA	Exam	Total	Credits
BCA401	Computer Graphics and Multimedia	4	-	3	20	80	100	2
BCA402	Visual Basic .NET Programming	4	-	3	20	80	100	2
BCA403	Principles of TCP/IP	4	-	3	20	80	100	2
BCA404	E-Commerce	4	-	3	20	80	100	2
BCA405	Elective Stream-I: E1.1 E1.2 E1.3	4	-	3	20	80	100	2
BCA406	Computer Graphics Lab	-	6	3	20	80	100	2
BCA407	VB.Net Lab	-	6	3	20	80	100	2
BCA409	CC & EC	-	-	-	50	-	50	1
	Total	20	12		190	560	750	15

BCA405 - Elective Stream-I:
E1.1: Computer Oriented Numerical Analysis
E1.2: Computer Oriented Statistical Methods
E1.3: System Analysis and Design

PAPER-XII	**BCA401: COMPUTER GRAPHICS AND MULTIMEDIA**	**48 hours**
Theory/Week: 4 Hrs **Credits: 2**		**I.A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

Overview of Graphics Systems: Video Display devices, Raster-Scan Displays, Raster -Scan Systems, Random Scan Systems, Graphics Monitors and Workstations, Input Devices, Hard-Copy Devices, Graphics Software. **Output Primitives**: Points and Lines, Line Drawing Algorithms- DDA, Bresenham's, Loading the Frame Buffer, Line Function, Circle Generating Algorithms, Ellipse Generating Algorithms, Filled-Area primitives.

	UNIT-II	**12 Hrs.**

Attributes of Output Primitives: Line attributes, Curve Attributes, Color and Grayscale levels, area fill attributes, Character attributes. **Two Dimensional Geometric Transformations**- Basic Transformations, Matrix Representations and Homogeneous Coordinates, Composite Transformations, Other Transformations, Transformations between Coordinate Systems, Affine Transformations. **Two-Dimensional Viewing:** The Viewing Pipeline, Viewing Coordinate Reference Frame, Window-to-Viewport Coordinate Transformation, Two-Dimensional Viewing Functions, Clipping operations, Point clipping, Line clipping- Cohen- Sutherland Line clipping, Polygon clipping-Sutherland-Hodgeman Polygon clipping.

	UNIT-III	**12 Hrs.**

Introduction: What is Multimedia? Definition, use of multimedia, delivering multimedia.
Text: The Power of meaning, About fonts and faces, Using fonts in multimedia, Using text in multimedia, computers and text, Font editing and design tools, Hypermedia and hyper text.
Images: How to create, Making still images, color, image file formats.
Sound: The Power of sound, digital audio, MIDI audio, MIDI vs. Digital audio, Multimedia system Sounds, Audio File formats, Vaughan's Law of Multimedia minimums, Adding sounds to multimedia Project.

	UNIT-IV	**12 Hrs.**

Animation: The Power of motion, Principles of animation, Animation by computer.
Video: Using video, How video works and is displayed? Digital video container, obtaining video clips, Shooting and editing videos.
Making multimedia: The stages of multimedia project, the needs for multimedia project, Input and output devices needed, software needed required authoring system.

Text Books:
1. Donald Hearn, M. Pauline Baker**, Computer Graphics - C version**, 2nd Edition, LPE Pearson. (Units: I and II)
2. Tay Vaughan, **Multimedia: Making It Work**, 8th Edition, Tata McGraw Hill, 2011. (Units: III and IV)

Reference Books:
1. Steven Harrington, **Computer Graphics: A Programming Approach**, McGraw Hill Education.
2. Ze-Nian Li and Mark S Drew, **Fundamentals of Multimedia**, PHI, 2009
3. Ralf Steinmetz and Klara Nahrstedt, **Multimedia: Computing, Communication and Applications**, LPE, Pearson Education

PAPER-XIII	**BCA402: VISUAL BASIC .NET PROGRAMMING**	**48 hours**
Theory/Week: 4 Hrs **Credits: 2**		**I A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

Essential Visual Basic .NET: Working with Visual Basic, New features, upgrading tips, the .NET frame work and the common Language runtime, building VB .NET applications, the visual Basic integrated Development Environment, coding to get the most from Visual Basic

The Visual Basic Language: operators, conditionals and loops: Keywords, statements, Syntax, the option and imports statements, constants, enumerations, variables, data types, arrays and dynamic arrays, Strings, conversion between strings and numbers, conversion between characters and character codes, Operators, Operator precedence, commenting, Decision making: if...else, select case statements, Selections - switch and choose, Loop - Do, For, For Each...Next, While statements; With statement, Handling higher math, dates, times, financial data; Ending a program any time

The Visual Basic Language: Procedures, scope and exception handling: Sub procedures and Functions, scope, exceptions, creating Sub procedures and Functions, commenting Procedures, passing arguments, preserving variable's values between Procedure calls with static variables, creating procedure delegates, creating properties, scope, unstructured exception handling, using Resume Next and Resume Line, On Error GoTo 0, getting an exception's number and description, raising an exception intentionally, structured exception handling, exception filtering in the Catch Block, Multiple Catch statements, using Finally, throwing an Exception, throwing a Custom Exception

	UNIT-II	**12 Hrs.**

Windows Forms: About Windows Forms, Windows MDI Forms, creating Windows Applications, Adding Controls to Forms, Events, A Windows Form in Code, setting Title Bar Text, Adding/Removing Min/Max Buttons and Setting a Form's Border, setting Control Tab Order, setting Forms' initial Positions, moving and sizing Forms and Controls in Code, showing and hiding controls in code, MsgBox Function, MessageBox.Show Method, InputBox Function, Multiple Forms, using Properties to communicate between Forms, setting up Startup Form, creating Multiple Document Interface(MDI) Applications, creating Dialog Boxes, Owned Forms, passing Forms to Procedures, Minimizing/Maximizing and Enabling/Disabling Forms, Adding and Removing Controls at runtime, creating Always-on-Top Forms, Visual Inheritance between Forms, setting the Mouse Pointer in Controls, Mouse Events, Keyboard Events, sending Keystrokes to other Programs, Beeping.

Windows Forms: Text Boxes, Rich Text Boxes, Labels and Link Labels: The Control Class, Text Boxes, Rich Text Boxes, Labels and Link Labels, Text Boxes, creating Multiline, Word-wrap Text Boxes, Accessing Text in a Text BOX, Adding Scroll Bars to Text Boxes, Aligning text in Text Boxes, Making a Text Box read-only, selecting and replacing Text in a Text Box, copying or getting selected text to or from the clipboard, creating a password control, controlling input in a Text Box, Rich Text Boxes, accessing Text in a Rich Text Box, creating Bold, Italic, Underline and Strikeout Text, Indenting Text in Rich Text Boxes, Adding Bullets to Rich Text Boxes, Text color in RTF boxes, saving and loading RTF files from and to Rich Text Boxes, Aligning Text in RTB, creating RTB in Code, Labels, using Labels instead of Text Boxes, formatting, aligning Text in labels, Label Events, using Labels to give access keys to Controls without Captions, Link Labels

Windows Forms: Buttons, Checkboxes, Radio Buttons, Panels and Group boxes (all relevant sections)

	UNIT-III	**12 Hrs.**

Windows Forms: List Boxes, Checked List Boxes, Combo Boxes and Picture Boxes (all relevant sections)
Windows Forms: Scroll Bars, Spliters, Track Bars, Pickers, Notify Icons, Tool Tips and Timers (all relevant sections)
Windows Forms: Menus, Built-in Dialog boxes and Printing

Windows Forms: Image Lists, Tree and List Views, Toolbars, Status and Progress Bars and Tab	

UNIT-IV	**12 Hrs.**

Data Access with ADO.NET:
Binding Controls to Databases:
Handling Database in Code:

Text Book:
Steven Holzner, **Visual Basic.NET Programming Black Book**, Dreamtech Press

Reference Books:
1. Bradley, Millspaugh Julia Case, Anita, **Programming in Visual Basic. NET**, Tata McGraw Hill
2. Dr Garima Khadelwal, **Programming with Visual Basic. NET**, Prakhar Publishers Distributors
3. M Vishwanath Pai, **A Book on VB.NET**

PAPER-XIV	**BCA403 : PRINCIPLES OF TCP/IP**	**48 hours**
Theory/Week: 4 Hrs **Credits: 2**		**I.A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**
	Evolution of open Networks, Layering of communication process, TCP/IP Layering, standardization, Internetworking Concept and Architectural Model, Internet Addresses. Link Layer Encapsulation, Physical addresses, IEEE & MACs. ARP – Operations, Cache & time outs. RARP – Overview, Operations, Primary and Backup RARP Servers. Loopback Interface	
	UNIT-II	**12 Hrs.**
	IP Routing Principles, Routing IP Datagrams, RIP, OSPF, HELLO, BGP, Trace route program, CIDR-Subnetting, VLSM, Supernetting	
	UNIT-III	**12 Hrs.**
	UDP Header, UDP Checksum, Multiplexing, Demultiplexing & Ports, Maximum Datagram Size. Sliding Windows, TCP - Passive and Active Opens, RTT Estimation, TCP Connection Establishment and Termination, Delayed Acknowledgement and Nagles Algorithm , TCP Timers, Multicasting – IP Multicast Addresses, IGMP. DNS – Basics, Resolution, Caching, DNS Message Format, TELNET Protocol, Rlogin – protocol.	
	UNIT-IV	**12 Hrs.**
	FTP – Protocol, Process Model. TFTP, NFS, SMTP – Protocol. POP, IMAP, MIME. IPV6 – Features, Datagram format, Use of Multiple Headers, IPV4 Vs IPV6.	

Text Book:

> Comer Douglas E**, Internetworking with TCP/IP** : Principles, Protocols, And Architecture, Vol. I, 5th Edition, Phi Learning, 2010

Reference Books:
1. Peter Loshin, **TCP/IP Clearly Explained** , Elsevier India, 1999
2. Behrouz A. Forouzan, *TCP/IP Protocol Suite*, 2nd Edition, Tata Mc-Grow-Hill publications, , 2003

PAPER-XV	BCA404 : E-COMMERCE	48 hours
Theory/Week: 4 Hrs **Credits: 2**		**I A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**
Introduction to Electronic Commerce: The meaning, benefits, impact, Classification, application of Electronic Commerce technologies. **Electronic Commerce Business models:** meaning of business model	

Introduction to Electronic Commerce: The meaning, benefits, impact, Classification, application of Electronic Commerce technologies.
Electronic Commerce Business models: meaning of business model

	UNIT-II	**12 Hrs.**

Electronic Data Interchange: conventional trading process, meaning of EDI, building blocks of EDI system, layered architecture, value added networks, benefits and application of EDI
Electronic Commerce: Architectural framework:
Electronic Commerce: Information distribution and messaging: FTP application, Email, WWW server, HTTP, Web Servers implementation

	UNIT-III	**12 Hrs.**

Electronic Commerce : Network infrastructure: LAN, Ethernet LAN, WANs, Internet, TCP/IP reference model, Domain Name systems, Internet industry structure
Electronic Commerce: securing the business on Internet: Vulnerability of information on Internet, security policy, procedures and practices, site security, protecting the network

	UNIT-IV	**12 Hrs.**

Electronic Commerce: securing the business on Internet: transaction security, cryptography, digital signature, email security
Electronic Payment System: Introduction to payment system, Online payment system, prepaid electronic payment systems, requirement metrics of a payment system
Mobile Commerce: Introduction, Framework and models: meaning, benefits, impediments, framework

Text Book:
Bharat Bhaskar, **Electronic Commerce: Framework, Technologies and Applications**, 2nd edition, McGraw Hill company, 2006

Reference Books:
1. David Whiteley, **E-Commerce: Strategy, Technologies and Applications**, Tata McGraw Hill Education Private limited, 2004
2. Ravi Kalakota, Andrew B. Whinston, **Frontiers of Electronic Commerce**, Addison-Wesley Publications, 2000
3. C. S. V. Murthy, **E-commerce: Concepts, Models, Strategies**, Himalaya Publishing House, 2011

PAPER-XVI	**BCA405-E1.1 : COMPUTER ORIENTED NUMERICAL ANALYSIS**	**48 hours**
Theory/Week: 4 Hrs **Credits: 2**		**I A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

Errors in numerical computation - Errors and their computation
Solution of Algebraic and Transcendental equations: Introduction, the Bisection method, the method of False position, the Iterative method, Newton-Raphson method, Ramanujan's method.
Interpolation: Introduction Finite differences- forward differences, backward differences, Central differences, Newton's formula for interpolation, Languages interpolation formula.
Divided differences- Newton's general interpolation formula

	UNIT-II	**12 Hrs.**

Least Squares - Introduction, least squares curve fitting procedures - fitting a straight line, non-linear curve fitting, curve fitting by a sum of exponentials
Numerical differentiation and integration - Numerical differentiation, Integration- Trapezoidal rule, Simpson's 1/3 rule and Simpson's 3/8 rule.

	UNIT-III	**12 Hrs.**

Matrices and linear system of equations :
Basic definitions, matrix operations, transpose of a matrix, the inverse of a matrix, matrix norms.
Solution of linear system: Direct methods- Matrix inversion method, Gaussian elimination method, Gauss-Jordan method, LU decomposition.
Solution of linear systems- Iterative methods- Gauss-Seidal methods, Jacobi's method.

	UNIT-IV	**12 Hrs.**

Numerical solution of ordinary differential equations: Solution by Taylor's series, Euler's method, Modified Euler's method, Runge-Kutta methods, Predictor-corrector methods - Adams-Moulton method, Milne's method, Boundary value problems- Finite difference method.

Text Book
      S.S. Sastry, **Numerical Analysis**, 3rd edition, PHI publication.

Reference Book
   1. M. K. Jain, S.R.K. Iyengar & R. K. Jain, **Numerical methods for Scientific and Engineering computation,** 5th edition, New Age International publishers.
   2. V Rajaraman, **Computer Oriented Numerical Methods**, 3rd Edition, PHI, 2006.

PAPER-XVI	**BCA-405-E1.2 : COMPUTER ORIENTED STATISTICAL METHODS**	**48 hours**
Theory/Week: 4 Hrs **Credits: 2**		**I A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

Statistics-Introduction, Statistics defined, functions of statistics, application of statistics, limitation of statistics

Organizing a statistical survey - Introduction, planning the survey, executing the survey

Collection of data: Introduction, Primary and secondary data, methods of collecting data, Questionnaire (Drafting, Pre-testing, specimen), sources of secondary data.

Sampling and sample designs: Introduction, census and sample method, methods of sampling, non-probability sampling methods, probability sampling methods, size of sample, merits and limitations of sampling, sampling and non-sampling error

	UNIT-II	**12 Hrs.**

Classification and tabulation of Data: Introduction, objectives of classification, types of classification, formation of discrete frequency distribution, continuous frequency distribution, tabulation of data, parts of a table, general rules of tabulation, types of tables.

Diagrammatic and graphic representation: Introduction, significance of diagrams and graphs, general rules of constructing diagrams, types of diagrams, graphs, graphs of frequency distributions

Measures of Central Tendency: Arithmetic Mean, Median, Mode, Geometric Mean, Harmonic Mean, Relation among the averages

Measures of Dispersion:
The Quartile Deviation, Mean Deviation, Standard Deviation

	UNIT-III	**12 Hrs.**

Skewness, Moments and Kurtosis:
Introduction, tests of Skewness, measures of skewness, moments

Correlation Analysis: Introduction, correlation and causation, types of correlation, Graphic method - Karl Pearson's Coefficient of correlation

Regression Analysis: Introduction, uses, difference between correlation and regression analysis, Regression lines, Regression equations

Index numbers: Introduction, uses of index numbers, methods of constructing index numbers, the value index numbers, the chain index numbers, consumer price index numbers

Analysis of time series: Introduction, utility of time series, components of time series, measurement of trend

	UNIT-IV	**12 Hrs.**

Probability and expected value: Importance of the concept of probability, calculation of probability, conditional probability, Bayes' theorem, Mathematical expectation.

Theoretical distributions: Introduction, Binomial distribution, multinomial distribution, Poisson distribution.

Statistical quality control: Introduction, control charts, X chart, R chart

Text Book:
      S. P Gupta, Statistical Methods, 3rd Edition, Sultan Chand & Sons, 2005

Reference Book
      Chaudhari, Statistical Methods, Asian Books Private ltd

PAPER-XVI	BCA-405-E1.3: SYSTEM ANALYSIS AND DESIGN	48 hours
Theory/Week: 4 Hrs **Credits: 2**		**I.A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

System concepts and the information system environment: Introduction, system and its parts, system concepts, organization, managers and information, computer based information system. **System Development life cycle:** Introduction, The six phases of system analysis and design, system document considerations, life cycle models, Different approaches to improvement development, object oriented analysis and design. **Role of the system analyst**: Introduction, System analysts role and other organizational responsibilities in system development, Analytical, technical, managerial and interpersonal skills, ethics.

	UNIT-II	**12 Hrs.**

Requirement determination and specification: Performing requirements determination, traditional methods for requirement determination, contemporary methods for determining systems requirements, radical methods for determining system requirements, requirements determination using agile methodologies.

	UNIT-III	**12 Hrs.**

Process modeling: using DFDs in analysis process; Logic modeling, Conceptual data modeling and ER models.
Designing forms and reports

	UNIT-IV	**12 Hrs.**

Designing Interfaces and Dialogues, designing databases, Process Design input and output design, System development: SDLC

Text Book:
    J. B. Dixit, Raj Kumar, **Structured System Analysis and Design**, Laxmi Publications, 2008.

Reference Books:
    1. Senn, **Analysis and Design of Information Systems,** 2nd Edition, Tata McGraw Hill
    2. Elias M Awad, **System Analysis and Design**, 2nd edition, Galgotia Publications Pvt Ltd, New Delhi

Practical

Practical-VII	BCA406 : COMPUTER GRAPHICS LAB	72 hours
Practical/Week: 6 Hrs Credits: 2	Computer Graphics programs in C/C++	I.A: 20 Exam: 80

Practical-VIII	BCA407 : VB .NET Lab	72 hours
Practical/Week: 6 Hrs Credits: 2	Programming exercises in VB .NET	I.A: 20 Exam: 80

MANGALORE UNIVERSITY

Bachelor of Computer Applications (B.C.A) Course Pattern and Scheme of Examinations

V SEMESTER BCA

Subject Code	Subject	Theory Hours/ Week	Practical Hours/ Week	Duration of exams (Hrs)	Marks & Credits			
					IA	Exam	Total	Credits
BCA501	Software Engineering	4	-	3	25	100	125	2.5
BCA502	Linux Environment	4	-	3	25	100	125	2.5
BCA503	Web Development in .NET	4	-	3	25	100	125	2.5
BCA504	Java Programming	4	-	3	25	100	125	2.5
BCA505	Distributed Computing	4	-	3	25	100	125	2.5
BCA506	Elective Stream-II E.2.1: E.2.2: E.2.3:	4	-	3	25	100	125	2.5
BCA507	Web Technology Lab	-	6	3	25	100	125	2.5
BCA508	DC & Java Lab	-	6	3	25	100	125	2.5
	Total	24	12		200	800	1000	20

BCA-505: Elective Stream-II:
E.2.1: Artificial Intelligence
E2.2 : Management Information System
E2.3 : LAMP Technology

PAPER-XVII	**BCA-501 : SOFTWARE ENGINEERING**	**48 hours**
Theory/Week: 4 Hrs **Credits: 2**		**I.A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

Introduction: The Software Problem, Software Engineering Problem, The Software Engineering Approach. Software Processes: Software Process, Characteristics of a Software Process, Software Development Process, Waterfall Model, Prototyping, Iterative Enhancement, Spiral Model, Project Management Process, Phases of management process, Metrics, Measurement, and Models, Software Configuration Management Process, Configuration Identification, Change control, Status accounting and auditing, Process Management Process, Building estimation models, Process Improvement and maturity.

	UNIT-II	**12 Hrs.**

Software Requirements Analysis and Specification: Software Requirements, Need for SRS, Requirement process, Problem Analysis, Analysis Issues, Informal Approach, Structured Analysis, Prototyping, Requirements Specification, Characteristics of an SRS, Components of an SRS, Specification Languages, Structure of a Requirements Document, Validation, Requirement Reviews. Design Principles, Module-Level Concepts, Design Notation and Specification, Data Flow Diagrams, Structured Design Methodology, Verification.

	UNIT-III	**12 Hrs.**

Detailed Design: Module specification, Specifying functional module, Detailed design, PDL, Logic/Algorithm Design, Verification, Design Walkthroughs, Critical Design Reviews, Consistency checkers
Coding: Programming Practice, Top-Down and Bottom-Up, Structured Programming, Information Hiding, Programming Style, Internal Documentation, Verification, Code Reading, Static Analyses, Symbolic Execution, Proving Correctness, Code Inspections or Reviews, unit Testing.

	UNIT-IV	**12 Hrs.**

Testing and Maintenance: Testing Fundamentals, Error, Fault, and Failure, Test Oracles, Top-Down and Bottom-Up Approaches, Test Cases and Test Criteria, Psychology of Testing, Functional Testing, Equivalence class partitioning, Boundary value analysis, Cause effect graphing, Structural Testing, Control flow based criteria, Data flow based testing, Preventive and Corrective Maintenance.
Introduction to Testing tools: Overview of WinRunner, Silk Test, SQA Robot, LoadRunner, JMeter and Test Director (*relevant sections only*)

Text Books:
1. Pankaj Jalote, **An Integrated Approach to Software Engineering**, 2nd Edition, Narosa Publishing House, 2004
2. Dr. K.V.K.K. Prasad, **Software Testing tools**, Dreamtech Press.

Reference Books:
1. Roger S. Pressman, **Software Engineering: A Practioner's Approach**, McGraw Hill, 2009
2. K K Aggarwal, Yogesh Singh, **Software Engineering**, 1st edition, New Age International Pvt Ltd Publishers
3. Renu Rajni, **Software Testing: Methodologies, Tools and Processes**, Tata McGraw hill education private limited

PAPER-XVIII	**BCA-502 : LINUX ENVIRONMENT**	**48 hours**
Theory/Week: 4 Hrs **Credits: 2**		**I.A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

UNIX Operating System Overview : History, System Structure, Users perspective, Operating System services. Assumptions about Hardware. The Unix Kernel Architecture, Kernel Data structure, system Administration, Buffering of Reading & Writing Disc Blocks. Files: i-nodes, Regular File and Directory Structures, Path names and i-nodes, Super Block allocation of Disc Blocks, Other types of Files-Special Files

	UNIT-II	**12 Hrs.**

Systems Calls For The File Systems: Open, Read, Write, File and record Locking, Iseek, Close, File creation, Creation of Special files, Pipes, Mount and unmount operations of file systems, Link and Unlike, File system abstractions and Maintenance.
The I/O System: Driver Interfaces, Disk Drivers, Terminal Drivers, Streams, Inter-Process Tracing, System V IPC, Network Communication, Sockets

	UNIT-III	**12 Hrs.**

An Introduction to Linux : Introduction, About Operating Systems, Free and Open Source Software, Origin of Linux, Linux Kernel, Linux Features; Free and Inexpensive, Stable and Flexible, Fast and Reliable,
Easier to Use, Robust Programming and Application Environments, Built-in Networking Ability and Easy Access to the Internet, Increased Returns, Multi User and Multi Tasking Ability, Entertaining and Educative, Readily Available Help, Linux Distributions, Linux Opportunities, Introduction About Linux Distributions, RPM Based Distributions, Deb Based Distributions.
Linux Desktop Environment: XWindow System, Graphical Interfaces, GNOME Desktop, Customizing the GNOME Desktop, Customization of Panels, Customization of Menus, Customization of Desktop, K Desktop Environment, Customizing the K Desktop, XFCE Desktop Environment, Desktop Applications
Managing Linux Files and Folders : Introduction, Linux Files and Folders, Paths and Path Names, Linux System File Structure, Files and Folders Properties , Creating Files and Folders 86, Managing Files and Folders, Searching for Files, Linux File System, Linux File Managers.

	UNIT-IV	**12 Hrs.**

Linux Administration basics:
Introduction, administration powers, administering time and date, writing to CD/DVD, disk usage analyser, monitoring the system, managing devices and media, creating and editing disk partition, system testing, bootup manager, making startup USB disk, viewing log files, installing new languages, downloading applications and installing new releases, installing packages, setting up and managing computer network, adding printers, backing up files, managing users and groups.
Networking and Using the Internet: Introduction, Networking Fundamentals, Basics of the Internet, Internet Applications in Linux, About Web and Websites,

Text Books
1. Maurice J Bach, **The Design Of The Unix Operating System**, Phi learning private limited, 2009
2. K.L. James, **Linux: Learning the Essentials**, Phi learning private limited, 2011

Reference Books
    Richard Petersen, **Linux Complete Reference**, 6th Edition, Tata Mcgraw Hill Education Private Limited

PAPER-XIX	BCA-503 : WEB DEVELOPMENT IN .NET	48 hours
Theory/Week: 4 Hrs **Credits: 2**		**I.A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**
HTML - Concepts of Hypertext, Versions of HTML, Elements of HTML syntax, Head & Body Sections, Building HTML documents, Inserting texts, Images, Hyperlinks, Backgrounds and Colour controls, Different HTML tags, Table layout and presentation, Use of front size & Attributes. List types and its tags, Use of Frames and Forms in web pages, ASP & HTML Forms. An Introduction to HTML 5, HTML 4 Doctype Declaration, HTML 5 is Open to Interpretation, 4 Doctype Declaration, WAI-ARIA and HTML 5, Drawing With The Canvas Element, Video On the Web, Geo Location in HTML5, Working Off-Line in HTML5, Building Forms in HTML5, Using CSS Today, Understanding CSS Transitions, Hover Crafting with CSS, Enriching Forms Using CSS3 Properties, Transforming the Message, CSS3 - In Conclusion		
	UNIT-II	**12 Hrs.**
Overview of Dynamic Web page, introduction & features of **ASP.NET**, Understanding ASP.NET Controls, Applications, Web servers, installation of IIS. Web forms, web form controls -server controls, client controls. Adding controls to a web form, Buttons, Text Box, Labels, Checkbox, Radio Buttons, List Box. Adding controls at runtime. Running a web Application, creating a multiform web project. Form Validation: Client side validation, server Side validation, Validation Controls: Required Field Comparison Range. Calendar control, Ad rotator Control, Internet Explorer Control. **Overview of ADO.NET**, from ADO to ADO.NET. ADO.NET architecture, Accessing Data using Data Adapters and Datasets, using Command & Data Reader, binding data to data bind Controls, displaying data in data grid. XML in .NET , XML basics, attributes, fundamental XML classes: Document, text writer, text reader. XML validations, XML in ADO.NET, The XML Data Document.		
	UNIT-III	**12 Hrs.**
Web services: Introduction, State management- View state, Session state, Application state. SOAP, web service description language, building & consuming a web service. Web Application deployment. Caching. Threading Concepts, Creating Threads in .NET, managing threads, Thread Synchronization Security features of .NET, Role based security & Code access security, permissions		
	UNIT-IV	**12 Hrs.**
Overview of C#, C# and .NET, similarities & differences from JAVA, Structure of C# program. Language features: Type system, boxing and unboxing, flow controls, classes, interfaces, Serialization and Persistence, Serializing an Object, Deserializing an Object Delegates, Reflection.		

Text books:
1. Neha Kotecha, Sonal Mukhi, Vijay Mukhi, **ASP. Net with C# The Basics**, BPB Publishers, 2011
2. Ivan Bayross, **HTML 5 and CSS 3 Made Simple**, B P B Publications, 2011

Reference books:
1. **C# Made Simple**, BPB Publishers
2. Kogent Solutions Inc, **ASP.Net 3.5 in Simple Steps**, Wiley, 2011
3. Mark Pilgrim, **HTML5: Up and Running**, O'Reilly, 2010
4. Laura Lemay, Rafe Colburn, Denise Tyler, **Sams Teach Yourself Web Publishing with HTML and XHTML in 21 Days**, 3rd Edition, SAMS, 2010

PAPER-XX	**BCA-504: JAVA PROGRAMMING**	**48 hours**
Theory/Week: 4 Hrs **Credits: 2**		**I.A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

Java Fundamentals: The origins of Java, Java's contribution to the internet, The Bytecode, The Java Buzzwords, Object Oriented Programming, Structure of a simple program, The Java Keywords, Identifiers in Java, The Java Class Libraries

Data Types and Operators: Java's Primitive Types, Literals, Variables, The Scope and Lifetime of variables, Operators- Arithmetic Operators, Increment and Decrement Operators,, Relational and Logical Operators, Short-Circuit Logical Operators, The Assignment Operator, The Bitwise Operators, The Shift Operators, The ?: operator, Shorthand Assignments, Type Conversion in Assignments, Casting Incompatible Types, Operator Precedence, Expressions

Using I/O: Byte streams and character streams, predefined streams, reading console input, reading characters, strings, writing console output.

Control Statements: Input Characters from the Keyboard, The if statement, Nested ifs, The if..else..if Ladder, The switch statement, Nested switch statement, The for loop, The while Loop, The do..while Loop, break, continue, Nested Loops.

	UNIT-II	**12 Hrs.**

Arrays: One-Dimensional Arrays, Multidimensional Arrays,: Two –Dimensional Arrays, Irregular Arrays, Initializing Multidimensional Arrays, Alternative Array Declaration Syntax, Assigning Array References, Using the length member, The For..Each Style for loop, Iterating Over Multidimensional Arrays, Applying the Enhanced for, Strings, Using Command-Line Arguments

Classes, Objects and Methods: Class Fundamentals, Creating Objects, Reference Variables and Assignment, Adding Methods, Returning from a Method, Returning a Value, Using Parameters, constructors, Parameterized Constructors, Adding a Constructor, The new operator, Garbage Collection and Finalizers, The finalize() method, The this keyword, Controlling Access to Class Members, Java's Access Modifiers, , Pass Objects to Methods, Returning Objects, Method Overloading, Overloading Constructers, Recursion, Understanding static: Static Blocks, Introducing Nested and Inner Classes, Variable-Length Arguments

Inheritance: Inheritance Basics, Member Access and Inheritance, Constructors and Inheritance, Using super to Call, Superclass Constructors, Using super to Access Superclass Members, Creating a Multilevel Hierarchy, call to the Constructors, Superclass References and Subclass Objects, Method Overriding, Overridden Methods Support Polymorphism, Use of Overridden Methods, Using Abstract Classes, Using final, The Object Class.

	UNIT-III	**12 Hrs.**

Packages and Interfaces : Packages, Packages and Member Access, Understanding Protected members, Importing packages, Java's standard packages, Interfaces, Implementing Interfaces, Using Interface References ,Variables in Interfaces, Extending Interface.

Exception Handling: The Exception Hierarchy, Exception Handling Fundamentals, try and catch, The Consequences of an Uncaught Exception, Using Multiple catch statements, Catching Subclass Exceptions, nested try blocks, Throwing an Exception, Rethrowing an Exception, Using finally, Using throws, Java's Built-in Exceptions, Creating Exception Subclasses.

Multithreaded Programming : Multithreading fundamentals, The Thread Class and Runnable Interface, Creating a Thread, Creating Multiple Threads, Determining When a Thread Ends, Thread Priorities, Synchronization, Using Synchronized Methods, The synchronized Statement, Thread Communication Using notify(), wait() and notifyAll(), Suspending, Resuming, and Stopping Threads

UNIT-IV	12 Hrs.

Applets, Events, and Miscellaneous Topics: Applet Basics, Applet Organization and Essential Elements, The Applet Architecture, A Complete Applet Skeleton, Applet Initialization and Termination,, Requesting Repainting-The update() Method, Using the Status Window, Passing parameters to Applets, The Applet Class ,Event Handling The Delegation Event Model, Events, Using the Delegation Event Model, More Java Keywords.

Using AWT controls, Layout managers and menus.

Control Fundamentals - Labels, Buttons, CheckBoxes, CheckboxGroup, Choice Cotrols, Lists, Scroll Bars, TextField, TextArea.

Layout Managers: FlowLayout,BorderLayout, GridLayout, Menu Bars and Menus

Introducing Swing: The Origins and Design Philosophy of Swing, Components and Containers, Layout Managers, Use Jbutton, Work with JTextField, Create a JCheckBox, Work with Jlist, Use anonymous inner classes to handle events, Create a Swing applet

Text Books:
1. Herbert Schildt, **Java: A Beginner's Guide**, 5th Edition, Tata McGraw Hill Education Private Limited, 2011.
2. Herbert Schildt, **The Complete Reference Java**, 7th Edition, Tata McGraw Hill Publishing Company Limited. (Chapters: 13, 24)

Reference books:
1. E Balagurusamy, **Programming With Java: A Primer**, Tata McGraw Hill Education Private Limited, 2009
2. Junaid Khateeb and Dr. G T Thampi, **Computer Programming in Java**, Dreamtech, 2011

PAPER-XXI	**BCA-505 : DISTRIBUTED COMPUTING**	**48 hours**
Theory/Week: 4 Hrs **Credits: 2**		**I.A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

Distributed Computing: An introduction - definition, history, different forms of computing, strengths and weaknesses, basics of operating system, network basics, software engineering basics

Interprocess Communication- An archetypal IPC program interface, event synchronization, timeouts and threading, deadlocks and timeouts, data representation, data encoding, text based protocols, request-response protocols, event diagram and sequence diagram, connection-oriented versus connectionless IPC, the evolution of paradigm for interprocess communication

	UNIT-II	**12 Hrs.**

Distributed Computing paradigms - Paradigms and abstraction, An example application, paradigms for distributed applications, tradeoffs.

The Socket API - Background, the socket metaphor in IPC, the datagram socket API, the stream mode socket API, socket with non-blocking I/O operations, secure socket API

	UNIT-III	**12 Hrs.**

The Client Server paradigm - Background, Client Server paradigm issues, software engineering for a network service, connection-oriented and connectionless servers, iterative server and concurrent server, stateful servers

Group communication - Unicasting versus multicasting, an archetypal multicast API, connectionless versus connection oriented multicast, Reliable multicasting versus unreliable multicasting, the Java basic multicast API, reliable multicast API

	UNIT-IV	**12 Hrs.**

Distributed Objects - message passing versus distributed objects, an archetypal distributed object architecture, distributed object systems, remote Procedure calls, Remote Method Invocation, the Java RMI architecture, the API for Java RMI, A sample RMI application, steps for building an RMI application, testing and debugging, comparison of RMI and socket APIs.

Advanced RMI - client callback, stub downloading, RMI security manager.

Text Book :
    M L Liu, **Distributed Computing: Principles and Applications**, Pearson Education, 2004

Reference Books:
  1. Mukesh Singhal, Niranjan G.Shivaratri, **Advanced Concepts in Operating System**, Tata McGraw Hill
  2. Santosh Kumar K., Kogent Solutions, **JDBC, Servlets, and JSP Black Book**, Dreamtech Press, 2008
  3. Willaim Grosso, **Java RMI**, Shroff/O'reilly, 2002

PAPER-XXII	**BCA-506-E2.1 : ARTIFICIAL INTELLIGENCE**	**48 hours**
Theory/Week: 4 Hrs **Credits: 2**		**I.A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

Overview of A.I: Introduction to AI, Importance of AI, Early work in AI, AI and its related field.
AI Techniques, Example of Tic-Tac-Toe, Turing test.
Problems, problem space and search: Defining the problem as a state space search.
Production system: Introduction, control strategies, Heuristic search, Issues in the design of search program.
Heuristic search techniques: Generate and test, Hill climbing: Simple hill climbing and steepest ascent hill climbing agendas, best first search technique, problem reduction, constraint satisfaction.

	UNIT-II	**12 Hrs.**

Knowledge concepts: Introduction**,** Definition and importance of knowledge, some knowledge based systems, Knowledge representation, organization, manipulation, acquisition.
Various approaches used in knowledge representation, Issues in knowledge representation
Formalized Symbolic Logics: Introduction, syntax and semantics for propositional logic, syntax and semantics for FOPL, Properties of WFFs
Using Predicate Logic: Representing Simple Facts in logic, representing Instance and Isa relationship, computable functions and predicates.

	UNIT-III	**12 Hrs.**

Natural language processing: Introduction, Overview of linguistics, Grammars and languages, Basic parsing techniques, Semantic analysis and representation structures, The natural language generation and systems.
Pattern recognition: Introduction, The recognition and classification process, Learning classification Patterns, Recognizing and understanding speech.
General concept in Knowledge acquisition: Introduction learning, Types of learning, general learning model, Performance measures.

	UNIT-IV	**12 Hrs.**

Expert System architecture: Introduction, Characteristic features of expert system, background history, applications, importance of expert system, **Rule-based system architectures**
LISP and other AI Programming Language: Introduction to LISP: syntax and numeric functions, Basic List manipulation function, functions, Predicates and conditionals, input, output and local variables, Iteration and recursion, property lists and arrays, miscellaneous topics, PROLOG and other AI programming languages

Text Books:
1. E. Rich and K. Knight, **Artificial Intelligence**, TMH, 2nd edition
   (Sections : 1.3,1.3.1,1.5,2.1,2.2,2.2.1,2.2.2,2.5, 3.1,3.2, 3.2.1,3.2.2,3.3.1,3.3.3,3.4.1,3.5,4.2,4.3(all subsections),5.1,5.2,5.3)
2. D.W. Patterson, **Introduction to AI and Expert Systems**, Pearson Prentice Hall
   (Chapter 1, 2, 3, 4- 4.1 to 4.4, 12, 13, 15: 15.1 &15.2, 16)

Reference Books:
1. Stuart Russell, Peter Norvig, **Artificial Intelligence: A Modern Approach**, 2nd Edition, Pearson education, 2011
2. Saroj Kaushik, **Artificial Intelligence**, Cengage Learning India, 2011

PAPER-XXII	BCA-506-E2.2 : MANAGEMENT INFORMATION SYSTEMS	48 hours
Theory/Week: 4 Hrs **Credits: 2**		**I A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**
The meaning and role of MIS: What is MIS?. Decision support systems, systems approach, the systems view of business, MIS Organization within the company. Management Organizational theory and the systems approach: Development of organization theory, management and organizational behavior, management, information, and the systems approach.	
	UNIT-II	**12 Hrs.**
Information Systems for decision making: Evolution of an information system, Basic Information Systems, decision making and MIS, MIS as a technique for making programmed decisions, decision assisting information systems. Strategic and project planning for MIS: General business planning, appropriate MIS response, MIS planning – general, MIS planning – details.	
	UNIT-III	**12 Hrs.**
Conceptual system design: Define the problems, set system objectives, establish system constraints, determine information needs, determine information sources, develop alternative conceptual designs and select one, document the system concept, prepare the conceptual design report.	
	UNIT-IV	**12 Hrs.**
Implementation, evaluation and maintenance of the MIS: Plan the implementation, acquire floor space and plan space layouts, organize for implementation, develop procedures for implementation, train and operating personnel, computer related acquisitions, develop forms for data collection and information, dissemination, develop the files, test the system, cut over, document the system, evaluate the MIS, control and maintain the system. Pitfalls in MIS development: Fundamental weaknesses, soft spots in planning, design problems, implementation.	

Text books:
1. R. G. Murdick, J. E. Ross and J. R. Clagget, **Information Systems for Modern Management**, 3rd Edition, PHI, 1994.
2. Parker, Charles Case, Thomas, **Management Information System: Strategy & Action**, 2nd Edition, TMH, 1993

Reference Books:
O'brien J, **Management Information Systems** (Special Indian Edition), 9th Edition, Tata McGraw Hill Education private limited , 2010

PAPER-XXII	BCA-506-E2.3 : LAMP TECHNOLOGY	48 hours
Theory/Week: 4 Hrs **Credits: 2**		**I A: 20** **Exam: 80**
	UNIT-I	**12 Hrs.**

Linux Operating System: Linux Operating System Concepts and Architecture; Overview of the Linux Kernel, User Space, Kernel Space; Processes and Daemons, Process Control; Overview of Linux Administration; Linux File system, User, Group and Resource Management; Configuration Files Overview; File system Permissions, Access Permissions and Security, Common Filesystem Commands, Recursion Option in Commands, Find, Grep, Cat, More, Less and Sort Commands.

	UNIT-II	**12 Hrs.**

Apache Web Server: Linux distribution Apache Installation; Starting and stopping Web Server Apache Configuration files; Apache Directives – Server Configuration, Directory level configuration: htaccess and <Directory>, Access Control, URL Pathnames, MIME types, CGI files, Automatic directory Indexing, Authentication, Log files; Virtual Hosting – IP Address Virtual Host, Name Based Virtual Host, Dynamic Virtual Hosting; Server Side includes; Apache GUI Configuration Tools ậ Comanche and linuxconf; Web Server Security –SSL; Apache Web Server Configuration files

	UNIT-III	**12 Hrs.**

HTML/XHTML and HTTP: basics review, PHP and the web server Architecture model, Overview of PHP capabilities, CGI vs. Shared Object Model, PHP HTML Embedding Tags and Syntax, simple PHP script example; PHP and HTTP environment variables
MYSQL Database Server: Installation- precompiled packages, post installed configuration, post installed troubleshooting; MySQL Administration; Commands – myisamchk, mysql, mysqladmin, mysqlbug, mysqlimport, mysqlshow; Creating users and granting them permissions; Creating databases; Data types; Creating a table; Graphical tools
PHP: Obtaining, Installing and configuring PHP; obtaining PHP Source code; Installing PHP from Binary Packages; PHP and security considerations; PHP configuration parameters and the php.ini File; Language Options, Register Globals and Security Resource limits parameters, Error Handling and Logging parameters; Data handling parameters, Paths and Directories, Dynamic Extensions, Checking install with phpinfo function.

	UNIT-IV	**12 Hrs.**

PHP Language core: Variables, Constants and Datatypes, and Operators; Decision making, Flow control and loops; Arrays and Array operations, Two dimensional and multidimensional arrays, Strings and strings operations; Functions, Function Declaration and parameter passing; Outputting data, include and require statements; file and Directory Access Operation; Error Handling and Reporting Considerations; Processing HTML From Input from the User ; Creating a Dynamic HTML Form with PHP; Login and Authenticating Users; Using GET, POST, SESSION and COOKIES variable; Session management and Variables; Working with Cookies, Sending Emails; Object Oriented PHP: Classes and Constructors
Database Operation With PHP: Built-in Database Function ,Connecting to a MySQl Database; Selecting a Database, Building and Sending the Query to Database; Engine, Retrieving Result â¢€ Retrieving, Updating and Inserting   Data;   Sample Database Routines and Code Segments, Logging Database; Operations for Troubleshooting

Text books:
1. Lee , **Open Source Development with LAMP : Using Linux, Apache, MySQL, Perl and PHP**, Pearson Education, 2006
2. Timothy Boronczyk, et al, **Beginning PHP6, Apache, MySQL Web Development**, Wiley India Pvt Ltd, 2009
3. Julie C Meloni, **Teach Yourself PHP, MySQL and Apache All-in-One**, SAMS, 2008

Reference Books:
1. W. Jason Gilmore, **Beginning PHP and MySQL: From Novice to Professional**, 4th Edition, Apress, 2010
2. Aleksa Vukotic, James Goodwill, **Apache Tomcat 7**, Apress, 2011
3. Richard Petersen, **Linux Complete Reference, 6th Edition,** Tata McGraw Hill Education Private Limited

Practical

Practical-IX	**BCA507 : WEB TECHNOLOGY LAB**	**72 hours**
Practical/Week: 6 Hrs Credits: 2	Web development programs using HTML, ASP.NET and C#	I.A: 20 Exam: 80

Practical-X	**BCA508 : DC AND JAVA LAB**	**72 hours**
Practical/Week: 6 Hrs Credits: 2	Programming exercises in Java (including RMI applications)	I.A: 20 Exam: 80

MANGALORE UNIVERSITY

Bachelor of Computer Applications (B.C.A) Course Pattern and Scheme of Examinations

VI SEMESTER BCA

Subject Code	Subject	Theory Hours/ Week	Practical Hours/ Week	Duration of exams (Hrs)	IA	Theory Exam	Total Marks	Credits
BCA-601	Project Work /Dissertation	-	36	-	160	400 (Project Report) 240 (Viva)	800	16
Total			36		160		800	16

BACHELOR OF COMPUTER APPLICATIONS (BCA)

SIXTH SEMESTER

PAPER-XXIII	BCA-501 : PROJECT WORK/ DISSERTATION	432 hours
Project Work /Week: 36 Hrs Credits: 16		I.A: 160 Exam: 640

PROJECT GUIDELINES

Preamble: Project work has been made a part of BCA course to give students exposure in development of quality software solution. The primary emphasis of the project work is to understand and gain the knowledge of the principles of software engineering practices. As such, during the development of the project students shall involve themselves in all the stages of the software development life cycle (SDLC) like requirements analysis, systems design, software development/coding, testing and documentation, with an overall emphasis on the development of reliable software systems. Since, the project work spans over the entire final semester, the students shall be advised to take up projects for solving problems of software industry or any research organization or the real life problems suggested by the faculty in-charge of BCA project work in the institutions. Topics thus selected, should be complex and large enough to justify as a BCA project. The project should be genuine and original in nature and should not be copied from anywhere else.

GENERAL GUIDELINES TO THE INSTITUTIONS

- Calendar of Project Work shall be announced before the commencement of the Sixth semester. Calendar shall contain tentative schedules on submission of Project proposals, Project Acceptance, Project Synopsis, Problem Analysis document, System Design, Detailed Design, coding and testing, final report, internal assessment exams (at least two), Viva/Voce etc.
- Students shall undertake projects with real life problems (that has direct relevance in day-to-day activities or to knowledge extension) either in their colleges or in industry/research and development laboratories/software companies as recommended by the faculty in-charge of BCA project work in the institutions. If a student intends to do industry project, the faculty in-charge shall ensure that the projects are genuine and original in nature.
- There shall be not more than three members in a Project team.
- At least two internal assessment exams shall be conducted to evaluate the progress made by the students at different stages of project work. Such exams may include written tests, presentations, work demonstration, group discussion, viva-voce etc. so as to objectively assess the understanding gained by the students in course of their project work.

GUIDELINES TO EXAMINERS REGARDING PROJECT VIVA-VOCE

External and internal Examiners shall together conduct project viva-voce objectively. To begin with, the finer details about various points contained in the scheme of valuation may be conclusively agreed upon through mutual consultation. During project evaluation, a student shall present his/her work through live demonstration of the software application developed as a part of project. However, if live demonstration is not possible due to the reason that some companies do not divulge source code on account of ownership rights or copyrights, students may be allowed to make PPT presentation of their authentic works. In such cases, candidates shall produce necessary declarations issued by the companies to this effect. However, students shall be enabled to present their work in entirety. The primary objective of project evaluation shall be to assess the extent of effort that was put in to meet the objectives of the project and also to gauge the understanding gained by the students in course of their project works.

While evaluating Project Reports, examiners shall scrutinize whether Software Development Life Cycle (SDLC) principles have been consistently followed in the project work and the same are documented well in the Reports. However, the relative and overall emphasis of these principles to a particular problem domain chosen may be taken into account so that project evaluations remain fair and objective.

THE SCHEME OF PROJECT EVALUATION

Sl.No		Particulars	Marks
1		**Report Evaluation : 400 marks**	
	1.1	Innovativeness and utility of the project for Industry/Academic or society (Utility)	**40**
	1.2	Related studies about the project (Adequacy)	**40**
	1.3	Project plan & implementation - target achieved / output delivered (effectiveness)	
		1.3.1 Analysis	**80**
		1.3.2 Design	**80**
		1.3.3 Implementation	**80**
		1.3.4 Testing	**40**
	1.4	Other mandatory documents & information (certificates, contents, tables, figures, bibliography etc.)	**40**
2		**Viva-Voce : 240 marks**	
	2.1	Live Demonstration (Software execution) or Dry runs (Presentation of authentic screenshots or captured videos may be used to walk through complete scenarios) - consistency and completeness	**160**
	2.2	Question and Answer (Oral only or Oral and written)	**60**
	2.3	Soft Skills - Communication skills, Team spirit (if any for working in group)	**20**
		Total Marks	**640**

FORMAT OF PROJECT SYNOPSIS

1. The project proposal (Synopsis) should contain the following details:

2. Title of the Project.

3. Introduction and objectives of the Project.

4. Project Category (Database/Web Application/ Client-server/Networking/ Multimedia/ gaming etc.).

5. Tools / Platform, Hardware and Software Requirement specifications.

6. Analysis (DFDs at least up to second level, ER Diagrams/ Class Diagrams, Database Design etc. as per the project requirements).

7. A complete structure which includes:

8. Number of modules and their description to provide an estimation of the student's effort on the project, Data Structures as per the project requirements for all the modules, Process logic of each module, Testing process to be used, Reports generation (Mention tentative content of report).

9. Whether Industry Defined/Client Defined/User Defined Project? Mention the type. Mention the Name and Address of the Industry/Client.

10. Limitation of the project.

11. Future scope and further enhancement of the project.

THE PROJECT REPORT

The project report shall contain the following:

- **Introduction**
- **Objectives**
- **Tools/Environment used**
- **Requirement Analysis Document** (include SRS in proper structure based on Software Engineering concepts, E-R diagrams/Class diagrams/any related diagrams (wherever applicable), Data Flow Diagrams/other similar diagrams (if applicable), Data dictionary)
- **Design Document** (System & Detailed - Modularization details, Data integrity & constraints including database design, Procedural design, User interface design)
- **Program code** (Complete code (well indented)/Detailed specification instead of code, Comments & Description. The program code should always be developed in such a way that it includes complete error handling, passing of parameters as required, placement of procedure/function statements as needed.)
- **Testing** (Test case designs are to be included separately for Unit testing, Integration testing, System testing; Reports of the outcome of Unit testing, Integration testing, System testing are to be included separately)
- **Input and Output Screens**
- **Limitations**
- **Future scope**
- **Bibliography**

AWARD OF MARKS

Particulars	Max. Marks
Internal Exam Marks	160
Final Exam Marks	
Project Dissertation	400
Project Viva/voce	240
Total	**800**