

**Detailed Syllabi**  
**BCA**  
**SEMESTER-I**

# SEMESTER-1

<b>Paper Code: BCA-101</b>		<b>(L,3-T,1-P,0)</b>
<b>Paper Name:Computer Systems and Organization</b>		<b>Credit 4</b>
<b>Course Outcomes</b>		
Through this course student should be able to		
CO1: identify the basic concepts and terminology of computer and information technology.		
CO2: describe the various memories and I/O devices.		
CO3: understand the working as well as the operations of the various components of operating system		
CO4: visualize various types of network and technology and implementation of logic gates		
<b>Unit - I</b>	<b>Basics of Computer and its Evolution:</b> Definition of Computer, Data and Information, Characteristics of Computers, Advantages and Limitations of Computer, Different Generation of Computers, Application, Block diagram of Computer, Function of Different Units of Computer, Classification of Computers, Von Newman Model, Number Systems and their Inter-conversion.	
<b>Unit - II</b>	<b>Processing Unit and Memory Organization</b> Parts of processing unit and their working. Input and Output Devices: Keyboard, Mouse, Scanner, Touch Screen, Monitor, Printer, etc. Memory: Primary Memory, Secondary Memory, Virtual Memory, Cache Memory, Associative Memory, Memory management hardware. Logic Gates: AND gate, OR gate, K Map.	
<b>Unit –III</b>	<b>Computer Software:</b> Software, Types of Software, Computer Languages, Compiler, Interpreter. <b>Operating System:</b> Introduction, Functions of operating system, Types of operating system.	
<b>Unit –IV</b>	<b>Windows Operating Environment:</b> Control Panel, Creating user, Setting Password, Screensaver, Background, Windows Accessories. <b>Disk Operating System:</b> DOS, GUI and CUI, Directory and Sub-directory, Basic Internal and External Commands, Multiprocessors and Microprocessors operation	
<b>Unit - V</b>	<b>Digital Logic:</b> Logic gates, Encoder, Decoder, Half adder, Full adder, K-maps, Flip flops, Multiplexer and Demultiplexer, Canonical forms and Simplification	
<b>Text Books:</b>		
1. R.K. Taxali : Introduction to Software Packages, GalgotiaPublicaions.		
2. Pradeep k Sinha&PritiSinha: Computer Fundamentals paperback by, BPBPublications		
3. RajaramanV, AdabalaN: Fundamentals of computers paperback by, PHILearning		

<b>Paper Code: BCA-102</b>		<b>(L,3-T,1-P,0)</b>	
<b>Paper Name: Programming in C</b>		<b>Credit 4</b>	
<b>Course Outcomes</b> Through this course students should be able to CO1: make an algorithms and draw flowcharts for solving Mathematical and Engineering problems. CO2: understand the computer programming language concepts. CO3: demonstrate the data types and use them in simple data processing applications. CO4: develop confidence for self education and ability for life-long learning needed for Computer language			
Unit-I	<b>Logic Development Tools:</b> Data Representation, Flow Charts, Problem Analysis, Decision Tree, Decision Table, Pseudo Code and Algorithm <b>Fundamentals:</b> Character Set, Identifiers and Key Words, Data Types, Constants, Variables, Expressions, Statements, Symbolic Constants.		
Unit-II	<b>Operators and Expressions:</b> Arithmetic Operators, Unary Operators, Relational and logic Operators, Assignment and Conditional Operators, Library functions. <b>Data Input and Output:</b> Preliminaries, single character Input, single character output, entering input data, more about scan function, writing output data more about print functions, gets and puts functions, interactive programming.		
Unit-III	<b>Control Statements:</b> Preliminaries While, Do–While and For statements, Nested loops, If–else, Switch, Break – Continue statements. <b>Functions:</b> Brief overview, defining, accessing function, passing arguments to a function, specifying argument data types, function prototypes, recursion.		
Unit-IV	<b>Arrays:</b> Defining and processing as array, passing array to a function, multi – dimensional arrays. <b>Strings:</b> String declaration, string functions and string manipulation. <b>Pointers:</b> Fundamentals, pointer declaration, passing pointers to a functions, pointer and one dimension arrays, operation on pointers, pointers & multi–dimensional arrays, passing functions to other functions, more about declarations.		
Unit-V	<b>Structures &amp; Unions:</b> Defining and processing a structure, user defined data types, structures and pointers, passing structures to functions, self referential structure, unions. <b>Data Files:</b> Opening, closing, creating and processing of data files.		
<b>Text Books:</b> 1. Programming in C Schaum Outlines Series. 2. C Programming Stephen G. Kochan. 3. Let Us C YashwantKanitkar			

<b>Paper Code: BCA-103</b>		<b>(L,3-T,1-P,0)</b>
<b>Paper Name: Mathematics-I***</b>		<b>Credit 4</b>
<b>Course Outcomes</b> Through this course students should be able to CO1: discuss basic knowledge of sets, relations and functions. CO2: demonstrate the concept of integration and its rules for various applications. CO3: analyse the rules of differentiation on various elementary functions. CO4: apply the concepts of matrices and determinants for the solution of linear equations CO5: apply the concept of limit and continuity on elementary functions.		
Unit-I	<b>Set Theory, Relation:</b> Element of set Methods of describing a set. Types of set. Operation on set- union, intersection and differences of set. Venn diagram, Statement problems, Associative laws, distributive laws, De-morgans law, duality, partitioning of sets. Basic definition of relation and types of relations, graphs of relations, properties of relations. (domain, range, inverse and Composite relations).	
Unit-II	<b>Differentiation:</b> Introduction to differentiation, derivative of a function of one variable, power functions, sum and product of two functions, function of a function, differentiation by method of substitution, maxima and minima.	
Unit-III	<b>Integration:</b> Indefinite Integral, Integration by substitution, Integration by parts, Integration by partial fractions, Definite Integral. Numerical Integration: Trapezoidal rule, Simpson's 1/3 rule, Simpson's 3/8 rule.	
Unit-IV	<b>Statistics:</b> Introduction to statistics, measures of central tendency - mean, median and mode, measures of dispersion, mean deviation, standard deviation and coefficient of variation.	
Unit-V	<b>Matrix Algebra-</b> Matrix algebra- Matrices, types of matrices, operations on matrices, determinants (without properties), minors, cofactors, adjoint and inverse of a matrix, Elementary transformations in a matrix Rank of a matrix, solution of simultaneous equations using Crammer's rule and matrix inversion method.	
<b>Text Books:</b> 1. Text Book of Engineering Mathematics by N.P. Bali. 2. Higher Engineering Mathematics by B.S. Grewal.		

<b>Paper Code: BCA-104</b>		<b>(L,3-T,1-P,0)</b>
<b>Paper Name: Web Designing</b>		<b>Credit 4</b>
Unit-I	Internet and WWW: What is Internet? Introduction to internet and its applications, E-mail, telnet, FTP, e-commerce, video conferencing, e-business. Internet service providers, domain name server, internet address World Wide Web (WWW) : World Wide Web and its evolution, uniform resource locator (URL), browsers – internet explorer, netscape navigator, opera, firefox, chrome, mozilla. search engine, web saver – apache, IIS, proxy server, HTTP protocol	
Unit-II	HTML and Graphics : HTML Tag Reference, Block Level formatting, List Tags, Hyperlink tags, Image and Image maps, Table tags, Form Tags, Frame Tags, Executable content tags Imagemaps : What are Imagemaps?, Client-side Imagemaps, Server-side Imagemaps, Using Server-side and Client-side Imagemaps together, Alternative text for Imagemaps, Tables : Introduction to HTML tables and their structure, The table tags, Alignment, Aligning Entire Table, Alignment within a row, Alignment within a cell, Attributes, Content Summary, Background Color, Adding a Caption, Setting the width, Adding a border, Spacing within a cell, Spacing between the cells, Spanning multiple rows or columns, Elements that can be placed in a table, Table Sections and column properties, Tables as a design tool Frames : Introduction to Frames, Applications, Frames document, The <FRAMESET> tag, Nesting<FRAMESET> tag, Placing content in frames with the <FRAME> tag, Targeting named frames, Creating floating frames, Using Hidden frames,	
Unit-III	Java Script : Introduction, Client-Side JavaScript, Server-Side JavaScript, JavaScript Objects, JavaScript Security, Operators : Assignment Operators, Comparison Operators, Arithmetic Operators, % (Modulus), ++(Increment), --(Decrement), -(Unary Negation), Logical Operators, Short-Circuit Evaluation, String Operators, Special Operators, ?: (Conditional operator), , (Comma operator), delete, new, this, void Statements : Break, comment, continue, delete, do...while, export, for, for...in, function, if...else, import, labelled, return, switch, var, while, with,	
Unit-IV	Core JavaScript (Properties and Methods of Each) : Array, Boolean, Date, Function, Math, Number, Object, String, regExp Document and its associated objects : document, Link, Area, Anchor, Image, Applet, Layer Events and Event Handlers : General Information about Events, Defining Event Handlers, event, onAbort, onBlur, onChange, onClick, onDbIcClick, onDragDrop, onError, onFocus, onKeyDown, onKeyPress, onKeyUp, onLoad, onMouseDown, onMouseMove, onMouseOut, onMouseOver, onMouseUp, onMove, onReset, onResize, onSelect, onSubmit, onUnload	
Unit-V	XML : Introduction to XML, Anatomy of an XML document, Creating XML Documents, Creating XML DTDs, XML Schemas, XSL	
<b>Text Books:</b>		
1. Communicating design: developing web site documentation for design and planning, by Dan m. Brown.		
2. Design for hackers: reverse engineering beauty, by davidkadavy		
3. Jon duckket,beginning html, xhtml, css, and javascript Paperback		

<b>Paper Code: AECC-101</b>	<b>(L,0-T,0-P,0)</b>
<b>Paper Name: English Communication</b>	<b>No Credit:-00</b>
<b>Course Outcomes</b> Through this course students should be able to CO1: identify deviant use of English both in written and spoken forms and understand the importance of writing in academic life CO2: reorganize and correct the errors of usage to write simple sentences without committing errors of spelling and grammar CO3: assess their own ability to improve the competence in using the language. CO4: understand and appreciate English spoken by people from different regions and read independently unfamiliar texts with comprehension CO5: use language for speaking with confidence in an intelligible and acceptable manner	
Unit-I	<b>Introduction:</b> Theory of Communication, Types and modes of Communication <b>Grammar:</b> Sentence and its types, Articles, Parts of speech, Common errors
Unit-II	<b>Language of Communication:</b> <ul style="list-style-type: none"> <li>• Verbal and Non-Verbal (Spoken and Written)</li> <li>• Personal, Social and Business</li> <li>• Barriers and Strategies</li> <li>• Intra-personal, Inter-personal and Group Communication</li> </ul>
Unit-III	<b>Reading and Understanding:</b> <ul style="list-style-type: none"> <li>• Close Reading</li> <li>• Comprehension</li> <li>• Summary Paraphrasing</li> <li>• Analyzing and Interpretation</li> <li>• Translation (from Indian language to English and vice-versa)</li> <li>• Literary/Knowledge Texts</li> </ul>
Unit-IV	<b>Writing Skills:</b> <ul style="list-style-type: none"> <li>• Documenting</li> <li>• Report Writing</li> <li>• Making Notes</li> <li>• Letter Writing</li> </ul>
<b>Text Books:</b> <ol style="list-style-type: none"> <li>1. Oxford Practice Grammar By John Eastwood, Oxford University Press</li> <li>2. Textbook Of English Phonetics For Indian Students By Balasubramanian, Lakshmi Publications.</li> </ol>	

<b>Paper Code: BCAOE-101(A)</b>		<b>(L,3-T,1-P,0)</b>
<b>Paper Name: (Open Elective 1), Computer Fundamentals</b>		<b>Credit 4</b>
<b>Course Outcomes:</b> Through this course student should be able to  CO1: Understand operating system types and functionalities. CO2: Examine various input and output devices for storage purpose. CO3: Analyze different algorithms to solve real world associated tasks and problems. CO4: Identify usage of compiler, assembler in programming languages.		
<b>Unit - I</b>	Definition, Block diagram along with computer components, Characteristics & classification of computers, Hardware & software, Types of software, Operating System, Types of operating system, Functions of operating system, Examples of operating system,	
<b>Unit - II</b>	Input and Output devices, Memory, Primary and secondary memory, Types of primary memory, Storage devices.	
<b>Unit –III</b>	Processor, CPU, Fundamentals of Computer Networks.	
<b>Unit –IV</b>	Concept of Algorithm, Techniques for designing algorithms, Flowchart, Pseudo-code.	
<b>Unit - V</b>	Programming Languages, Assembler, Compiler, Interpreter, Program Writing and execution.	
<b>Text Books:</b> 1. R.K. Taxali : Introduction to Software Packages, GalgotiaPublicaions. 2. MS–Office 2003, Compiled by SYBIX. <b>Reference Book:</b> 1. MS–Office 2003, BPB Publications. 2. Introduction to Computer, P.K. Sinha. 3. Balagurusamy, Fundamental of Computer, TMH		

<b>Paper Code:BCAOE-101(B)</b>		<b>(L,3-T,1-P,0)</b>
<b>Paper Name: Fundamentals of Hardware and Networking</b>		<b>Credit 4</b>
<b>Course Outcomes:</b> Through this course student should be able to CO1: Understand operating system types and functionalities. CO2: Examine various input and output devices for storage purpose. CO3: Analyze different algorithms to solve real world associated tasks and problems. CO4: Identify usage of compiler, assembler in programming languages.		
<b>Unit - I</b>	Fundamentals of Information Technology & Operating Systems, Types of software, Operating System, Types of operating system, Functions of operating system, Examples of operating system,	
<b>Unit - II</b>	Basics of Electronics and Processors, processor types, functionalities, different processors roles and advantages.	
<b>Unit –III</b>	PC Assembling and Troubleshooting, Windows Server Administration	
<b>Unit –IV</b>	Software types and functionalities, Linux and Database administrations	
<b>Unit - V</b>	Programming Languages, Assembler, Compiler, Interpreter, Program Writing and execution.	
<b>Text Books:</b> 1. R.K. Taxali : Introduction to Software Packages, GalgotiaPublicaions. 2. MS–Office 2003, Compiled by SYBIX. 3. MS–Office 2003, BPB Publications. 4. Introduction to Computer, P.K. Sinha. 5. Balagurusamy, Fundamental of Computer, TMH		



**Detailed Syllabi**  
**BCA**  
**SEMESTER-II**

## SEMESTER-II

<b>Paper Code: BCA-201</b>		<b>(L,3-T,1-P,4)</b>
<b>Paper Name: Object Oriented Programming</b>		<b>Credit 6</b>
<b>Course Outcomes</b> Through this course students should be able to CO1: differentiate between the Procedure-oriented and Object-oriented programming languages CO2: practice the basic concepts of Object-oriented programming with C++ CO3: develop applications by using the concepts of Object-oriented programming CO4: represent data by using file handling concepts		
Unit-I	<b>Principles of OOP's and C++ Basics:</b> Introduction, Procedural Vs Object Oriented Programming, Basic Concepts of Object-Oriented Programming, Object Oriented Languages, Benefits of OOP's, A Brief History of C & C++, C Vs C++, A Simple C++ Program, Compiling & Linking, Tokens, Keywords, Identifiers & Constants, Data Types, Reference Variables, Decision Making & Control Structures, Operators in C++, Scope Resolution Operator.	
Unit-II	<b>Classes and Objects:</b> C structures revisited, Specifying Class, Defining member functions, Making outside function inline, Nesting of member functions, Private member functions, Arrays within class, Memory Allocation of objects, Friend functions, Access specifiers, Function Prototyping, Call by Value & Call by Reference, Inline Functions, Static Data Members & Functions.	
Unit-III	<b>Constructors and Destructors:</b> Constructors, Parameterized constructors, Copy Constructor and Dynamic Constructor, Multiple Constructor in a Class, Constructors with Default Arguments, Dynamic Initialization of Objects, Destructor.	
Unit-IV	<b>Operator Overloading and Type Conversions:</b> Overloading unary and binary operators, Overloading binary operators using Friend Function, Rules for operator overloading, Type conversions, Basic to Class Type.	
Unit-V	<b>Inheritance and Polymorphism:</b> Defining Derived Classes, Single Inheritance, Virtual Base Classes, Abstract Classes, This Pointer, Pointer to Derived Class, Virtual Function, Pure Virtual Function, Early Vs Late Binding. <b>Working with Files and Streams:</b> C++ Streams, C++ Stream Classes, Classes for File Stream Operation, Opening & Closing Files, Detection of End of File,File modes.	
<b>Text Books:</b> 1. Object oriented programming with C++ by EBalagurusamy, McgrawHill. 2. LET US C++ by YashavantKanetkar, BPB Publications 3. THE C++ PROGRAMMING LANGUAGE by BjarneStroustrup, Pearson		

<b>Paper Code: BCA-202</b>	<b>(L,3-T,0-P,2)</b>
<b>Paper Name: Python Programming</b>	<b>Credit-4</b>
<b>Course Outcomes</b>  Through this course students should be able to CO1: Understand the basic needs and features of Python programming language. CO2: Design programs using basic literals of Python programming language. CO3: Apply the pandas and NumPy for data analysis and Numerical Data. CO4: Deploy and evaluate the performance of various machine learning methods using Python.	
<b>Experiment 1.</b> Introduction to program and debugging. <b>Experiment 2.</b> Programs based on variables, expression and statements <b>Experiment 3.</b> Programs based on conditionals and iteration <b>Experiment 4.</b> Programs based on functions and recursion <b>Experiment 5.</b> Programs based on string (looping and counting, comparison, find function) <b>Experiment 6.</b> Programs based on lists (operations with lists). <b>Experiment 7.</b> Programs based on tuples and dictionaries (With different operations). <b>Experiment 8.</b> Programs based on files and exceptions. <b>Experiment 9.</b> Programs based on classes and objects <b>Experiment 10.</b> Programs based on Pandas and NumPy. <b>Experiment 11.</b> Programs based on Matplotlib for graphs <b>Experiment 12.</b> Programs based on Machine Learning	
<b>Practical books:</b> <ol style="list-style-type: none"> <li>1. Introduction to programming using Python by Y. Daniel Liang, Pearson.</li> <li>2. Python programming: using problem solving approach by ReemaThareja, Oxford University Press.</li> </ol>	

<b>Paper Code: BCA-203</b>		<b>(L,3-T,1-P,0)</b>	
<b>Paper Name: Mathematics-II</b>		<b>Credit-4</b>	
<b>Course Outcomes</b>			
Through this course students should be able to			
CO1: discuss basic knowledge of sets, relations and functions.			
CO2: demonstrate the concept of combinatorics, lattices and logics.			
CO3: analyse graphs and their elementary operations on real world applications.			
CO4: apply the concepts of tree for solving non-linear problems			
Unit-I	<b>Set Theory:</b> Definition of Sets, Venn diagram, Complements, Cartesian Products, power sets, counting principle, cardinality and countability, proofs of some general identities on sets. <b>Relation:</b> Definition, types of relation,composition of relations, domain and range of relations, partial order relations. <b>Function:</b> Definition and types of functions, composition of functions		
Unit-II	<b>Combinatorics:</b> Recurrence relation (nth order recurrence relation with constant coefficient, homogeneous and non-homogeneous),generating function, solution of recurrence relation using G.F., partial order sets, Hasse diagram.		
Unit-III	<b>Lattices and Propositional logics:</b> Definition and property of lattices- bounded, complemented, complete lattice, Boolean algebra, Karnaugh maps, logic gates, proposition logic, truth tables, tautologies.		
Unit-IV	<b>Graph Theory:</b> Graphs, subgraph, some basic properties, various operations on graph, Hamiltonian paths and circuits, Euler graphs, travelling salesman problem, connected and disconnected graphs, planner graphs, thickness and crossing coloring, chromatic numbers.		
Unit-V	<b>Tree-</b> Tree and fundamental circuits, distance diameters, radius and pendant vertices, spanning trees, finding all spanning trees of graph and weighted graph, prims algorithm, kruskals and Dijkstra algorithm.		
<b>Text Books:</b>			
1. Babu Ram, Discrete Mathematics by Pearson.			
2. Lipschutz and Lipson, “Discrete Mathematics” by TMH.			
3. Rosen, “Discrete mathematics and its applications”, TMH			

<b>Paper Code: BCAOE-201(A)</b>	<b>(L,3-T,1-P,0)</b>
<b>Paper Name:(Open Elective 1), Office Automation</b>	<b>Credit -04</b>
<b>Course Outcomes:</b> Through this course student should be able to  CO1: Understand basic features of MS word and text formatting. CO2: design graphics and image content for representation. CO3: develop and implement new excel features to gain hands on insight on Excel. CO4: Integrate power point features with online software.	
<b>Unit - I</b>	Introduction of MS Office. Working with MS-Word Basic Features Working with MS-Word Text formatting
<b>Unit - II</b>	Working with MS-Word Image formatting Working with MS-Word Graphics
<b>Unit –III</b>	Working with MS-Excel features such as: <ul style="list-style-type: none"><li>• Conditional Formatting.</li><li>• PivotTables.</li><li>• Paste Special.</li><li>• Add Multiple Rows.</li><li>• Absolute References.</li><li>• Print Optimisation.</li><li>• Extend formula across/down.</li></ul> Flash Fill.
<b>Unit –IV</b>	Working with MS-PowerPoint features such as: <ul style="list-style-type: none"><li>• Presenter View - new behind-the-scenes tools.</li><li>• Slide Zoom - zoom in on a diagram, chart, or graphic.</li></ul> Slide Navigator - switch slides in or out of sequence.
<b>Unit - V</b>	Exercise based presentation MS Word MS Excel MS Powerpoint
<b>Text Books:</b> 1. R.K. Taxali : Introduction to Software Packages, GalgotiaPublicaions. 2. MS–Office 2003, Compiled by SYBIX. 3. MS–Office 2003, BPB Publications. 4. Introduction to Computer, P.K. Sinha.	

<b>Paper Code: BCAOE-201(B)</b>		<b>(L,3-T,1-P,0)</b>	
<b>Paper Name (Open Elective 1), C Programming</b>		<b>Credit -04</b>	
<b>Course Outcomes</b> Through this course students should be able to CO1: make an algorithms and draw flowcharts for solving Mathematical and Engineering problems. CO2: understand the computer programming language concepts. CO3: demonstrate the data types and use them in simple data processing applications. CO4: develop confidence for self education and ability for life-long learning needed for Computer language			
Unit-I	<b>Logic Development Tools:</b> Data Representation, Flow Charts, Problem Analysis, Decision Tree, Decision Table, Pseudo Code and Algorithm <b>Fundamentals:</b> Character Set, Identifiers and Key Words, Data Types, Constants, Variables, Expressions, Statements, Symbolic Constants.		
Unit-II	<b>Operators and Expressions:</b> Arithmetic Operators, Unary Operators, Relational and logic Operators, Assignment and Conditional Operators, Library functions. <b>Data Input and Output:</b> Preliminaries, single character Input, single character output, entering input data, more about scan function, writing output data more about print functions, gets and puts functions, interactive programming.		
Unit-III	<b>Control Statements:</b> Preliminaries While, Do–While and For statements, Nested loops, If–else, Switch, Break – Continue statements. <b>Functions:</b> Brief overview, defining, accessing function, passing arguments to a function, specifying argument data types, function prototypes, recursion.		
Unit-IV	<b>Arrays:</b> Defining and processing as array, passing array to a function, multi – dimensional arrays. <b>Strings:</b> String declaration, string functions and string manipulation. <b>Pointers:</b> Fundamentals, pointer declaration, passing pointers to a functions, pointer and one dimension arrays, operation on pointers, pointers & multi–dimensional arrays, passing functions to other functions, more about declarations.		
Unit-V	<b>Structures &amp; Unions:</b> Defining and processing a structure, user defined data types, structures and pointers, passing structures to functions, self referential structure, unions.		
<b>Text Books:</b> 1. Let Us C Yashwant Kanitkar 2. Programming in C Schaum Outlines Series. 3. C Programming Stephen G. Kochan.			

<b>Paper Code: BCA-204</b>		<b>(L,0-T,0-P,4)</b>
<b>Paper Name: Fundamentals of Hardware and Networking</b>		<b>Credit-2</b>
<b>Course Outcomes:</b> Through this course student should be able to CO1: Understand operating system types and functionalities. CO2: Examine various input and output devices for storage purpose. CO3: Analyze different algorithms to solve real world associated tasks and problems. CO4: Identify usage of compiler, assembler in programming languages.		
<b>Unit - I</b>	Fundamentals of Information Technology & Operating Systems, Types of software, Operating System, Types of operating system, Functions of operating system, Examples of operating system,	
<b>Unit - II</b>	Basics of Electronics and Processors, processor types, functionalities, different processors roles and advantages.	
<b>Unit –III</b>	PC Assembling and Troubleshooting, Windows Server Administration	
<b>Unit –IV</b>	Software types and functionalities, Linux and Database administrations	
<b>Unit - V</b>	Programming Languages, Assembler, Compiler, Interpreter, Program Writing and execution.	
<b>Text Books:</b> 1. R.K. Taxali : Introduction to Software Packages, GalgotiaPublicaions. 2. MS–Office 2003, Compiled by SYBIX. 3. MS–Office 2003, BPB Publications. 4. Introduction to Computer, P.K. Sinha. 5. Balagurusamy, Fundamental of Computer, TMH		

<b>Paper Code: AECC- 201</b>		<b>(L,0-P,0-P,0)</b>
<b>Paper Name: Environmental Studies</b>		<b>No Credit-00</b>
<b>Course Outcomes:</b> Through this course students should be able to CO1: understand case studies on various eco-systems. CO2: recognize the usage of renewable and non-renewable resources. CO3: demonstrate the role of biodiversity and conservation in human life. CO4: apply various policies or methods to reduce environmental pollution.		
Unit-I	<b>Introduction to environmental studies &amp; Ecosystem:</b> Multidisciplinary nature of environmental studies; components of environment – atmosphere, hydrosphere, lithosphere and biosphere. Scope and importance; Concept of sustainability and sustainable development. Ecosystem, Structure and function of ecosystem; Energy flow in an ecosystem: food chain, food web and ecological succession. Case studies of the following ecosystems: 1. Forest ecosystem; 2. Grassland ecosystem; 3.Desert ecosystem 2. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)	
Unit-II	<b>Natural Resources: Renewable and Non-renewable Resources:</b> Land Resources and land use change; Land degradation, soil erosion and desertification. Deforestation: Causes and impacts due to mining, dam building on environment, forests, biodiversity and tribal populations. Water: Use and over-exploitation of surface and ground water, floods, droughts, conflicts over water (international & inter-state). Heating of earth and circulation of air; air mass formation and precipitation. Energy resources: Renewable and non-renewable energy sources, use of alternate energy sources, growing energy needs, case studies.	
Unit-III	<b>Biodiversity and Conservation:</b> Levels of biological diversity:genetic, species and ecosystem diversity; Biogeography zones of India; Biodiversity patterns and global biodiversity hot spots India as a mega-biodiversity nation; Endangered and endemic species of India Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts, biological invasions; Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity. Ecosystem and biodiversity services: Ecological, economic, social, ethical, aesthetic and Informational value.	
Unit-IV	<b>Environmental Pollution</b> Environmental pollution : types, causes, effects and controls; Air, water, soil, chemical and noise pollution Nuclear hazards and human health risks Solid waste management: Control measures of urban and industrial waste.. Pollution case studies.	
Unit-V	<b>Environmental Policies &amp; Practices</b> Climate change, global warming, ozone layer depletion, acid rain and impacts on human communities and agriculture. Environment Laws : Environment Protection Act; Air (Prevention & Control of Pollution) Act; Water (Prevention and control of Pollution) Act; Wildlife Protection Act; Forest Conservation Act; International agreements; Montreal and Kyoto protocols and conservation on Biological Diversity (CBD). The Chemical Weapons Convention (CWC). Nature reserves, tribal population and rights, and human, wildlife conflicts in Indian context	
Unit-VI	<b>Human Communities and the Environment:</b>	



	Human population and growth: Impacts on environment, human health and welfares.Environmental communication and public awareness, case studies (e.g., CNG vehicles in Delhi).
Unit-VII	<b>Field work</b> Visit to an area to document environmental assets; river/forest/flora/fauna, etc. Visit to a local polluted site – Urban/Rural/Industrial/Agricultural. Study of common plants, insects, birds and basic principles of identification. Study of simple ecosystems-pond, river, Delhi Ridge, etc.
<b>TEXT BOOKS:</b> <ol style="list-style-type: none"> <li>1. Carson, R. 2002. Silent Spring. Houghton Mifflin Harcourt.</li> <li>2. Gadgil, M., &amp;Guha, R.1993. This Fissured Land: An Ecological History of India. Univ. of California Press.</li> </ol> <b>Reference Book:</b> <ol style="list-style-type: none"> <li>1. Gleeson,B. and Low, N. (eds.) 1999. Global Ethics and Environment, London, Routledge.</li> <li>2. Gleick, P.H. 1993. Water in Crisis. Pacific Institute for Studies in Dev., Environment &amp; Security. Stockholm Env. Institute, Oxford Univ. Press.</li> <li>3. Grumbine, R. Edward, and Pandit, M.K. 2013. Threats from India’s Himalaya dams. Science, 339: 36-37.</li> </ol>	

**Detailed Syllabi**  
**BCA**  
**SEMESTER-III**

## SEMESTER – III

<b>Paper Code: BCA-301</b>		<b>(L,3-T,0-P,2)</b>
<b>Paper Name: Data Structures<sup>#</sup></b>		<b>Credit- 4</b>
<b>Course Outcomes:</b> Through this course student should be able to CO1: understand how basic data structures are represented in memory CO2: understand the computational efficiency of the principle algorithms for searching and sorting CO3: apply various data structures using sequential and linked representation CO4: analyze the alternate implementations of data structures to enhance performance CO5: apply different methods for traversing binary trees		
Unit-I	<b>Basic Data Structure:</b> Introduction to elementary Data Organization, Common Operation on Data Structures, Algorithm Complexity, Big O Notation, Time – Space trade-off between Algorithms. <b>Arrays:</b> Array Defined, Representing Arrays in Memory, Various Operations on Linear Arrays, Multidimensional Arrays.	
Unit-II	<b>Linked Lists:</b> Types of Linked Lists, Representing Linked Lists in Memory, Advantages of using Linked Lists over Arrays, Various Operations on Linked Lists, Doubly Linked List, Circular Linked List. <b>Stacks:</b> Description of STACK structure, Implementation of Stack using Arrays and Linked Lists, Applications of Stacks – Converting Arithmetic expression from infix notation to polish and their subsequent evaluation.	
Unit-III	<b>Queues:</b> Description of queue structure, Implementation of queue using arrays and linked lists, Description of priorities of queues, Types of Queues, Application of Queue.	
Unit-IV	<b>Trees:</b> Description of Tree Structure and its Terminology, Types of Tree, Tree representation in Memory, Binary Search tree, Traversing a Binary Tree, Huffman Tree, AVL Tree, Rotation in AVL Tree, B Tree. <b>Graphs:</b> Description of Graph Structure, Implement Graphs in Memory using Adjacency Matrix, Path Matrix.	
Unit-V	<b>Sorting and Searching:</b> Sorting Algorithms, Bubble Sort, Insertion Sort, Selection Sort, Merge Sort, Quick Sort, Searching Algorithms, Linear Search and Binary Search.	
<b>Text Books:</b> 1. Data Structures and Algorithms Made Easy by Narasimha Karumanchi 2. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein. Introduction to Algorithms. McGraw-Hill, 2001. 3. Donald E. Knuth. The Art of Computer Programming, Volumes 1-3. Addison-Wesley Professional, 1998. 4. S.B. Kishor Data Structures, Edition 3. Das GanuPrakashan, Nagpur, 2008		

<b>Paper Code: BCA-302</b>		<b>(L,3-T,1-P,0)</b>
<b>Paper Name: Operating Systems</b>		<b>Credit- 4</b>
<b>Course Outcomes</b> Through this course student should be able to  CO1: Recognize the basic structure of operating systems and classify roles and responsibilities of an operating System. CO2: Recognize the need and importance of fundamental concepts and principles of operating systems. CO3: Design the internal modules of an Operating System like memory management, process management, disk management and inter process communication etc.		
Unit-I	<b>Introduction to Operating System:</b> Operating System Operations and Functions, Multiprogramming and Multiprocessing System <b>Operating System Structure:</b> System Calls, <b>Process Management:</b> Process states, Process scheduling, Operations on processes, Process concept, Life cycle, Process control box <b>Introduction to OS concepts:</b> Evolution of OS, Operating system (OS) modes, services and functions, OS structure - kernel and its types	
Unit-II	<b>CPU Scheduling:</b> CPU scheduler and dispatcher, Scheduling criteria, CPU scheduler - preemptive and non-preemptive, Scheduling algorithms - process management in UNIX, First come first serve, Shortest job first, Round robin, Priority, Multi-level feedback queue, multiprocessor scheduling, real time scheduling	
Unit-III	<b>Threads:</b> Overview, Multithreading Models <b>Process Synchronization:</b> Critical Section Problem, Dining Philosopher Problem,Reader-writer Problem etc, Semaphores, Monitors, Synchronization hardware, Critical section problem - Two process solution, Peterson's Solution	
Unit-IV	<b>Deadlock:</b> Deadlock Characterization, Handling, Handling of deadlocks- Deadlock Prevention, Deadlock Avoidance & Detection, Deadlock Recovery, Starvation, Critical regions <b>File Management:</b> Allocation methods, Free-Space Management	
Unit-V	<b>Memory Management:</b> Objectives and functions, Simple resident monitor program, Overlays - swapping, Schemes - Paging - simple and multi level, Fragmentation - internal and external, Virtual memory concept, Demand paging, Page interrupt fault, Page replacement algorithms, Segmentation - simple, multi-level and with paging, Disk scheduling methods, Shared memory, Message queues, Passing File descriptors, Semaphores	
<b>Text Books:</b> 1. Abraham Siberschatz and Peter Baer Galvin, “ <b>Operating System Concepts</b> ”, Fifth Edition, Addision-Wesley. 2. Milan Milankovic, “ <b>Operating System, Concepts jand Design</b> ”, Mc Graw-Hill 3. Harvey M Deital, “ <b>Operating System</b> ”,addision-Wesley.		

<b>Paper Code: BCA-303</b>		<b>(L,3-T,1-P,0)</b>
<b>Paper Name: Fundamentals of Software Engineering</b>		<b>Credit-4</b>
<b>Course Outcomes:</b> Through this course student should be able to CO1: apply theoretical foundation of software engineering in practical software development CO2: visualize the importance of the software development process CO3: translate a requirements specification into an implementable design, following a structured and organised process CO4: formulate a testing strategy for a software system, employing test case design techniques such as functional and structural testing		
Unit-I	Introduction, what is software engineering? Software Development Life Cycle, Requirements Analysis, Software Design, Coding, Testing, Maintenance etc.	
Unit-II	Software Requirement Specification, Waterfall Model, Prototyping Model, Iterative Enhancement Model, Spiral Model, Role of Management in Software Development, Role of Metrics and Measurement, Problem Analysis, Requirement Specification, Validation, Metrics, Monitoring and Control	
Unit-III	System Design, Problem Partitioning, Abstraction, Top-down and bottom-up design, Structured Approach, Functional v/s Object-Oriented Approach, Design specification & verification, metrics, Monitoring & Control Coding, Top-down & Bottom-up, Structured Programming, Information Hiding, Programming Style, Internal Documentation, Verification, Metrics, Monitoring & Control.	
Unit-IV	Testing, Levels of Testing- Functional Testing, Structural Testing, Test Plan, Test Cases Specification, Reliability assessment.	
Unit-V	Software Project Management, Cost Estimation, Project Scheduling, Staffing, Software Configuration Management, Quality Assurance, Project Monitoring, Risk Management.	
<b>Text Books:</b> 1. Software Engineering- A Practitioners Approach, R. Pressman, McGraw Hill 2. An Integrated Approach to Software Engineering, PankajJalote, Narosa 3. Software Engineering: A Practitioners' Approach, R. A. Khan & A. Agarwal 4. Mall B, Fundamentals of Software Engineering, Prentice Hall India Learning Private Limited		

<b>Paper Code: BCA-304</b>	<b>(L,0-T,0-P,4)</b>
<b>Paper Name: Data Structure Lab<sup>#</sup></b>	<b>Credit 2</b>
<b>Course Outcomes:</b> Through this course student should be able to CO1: understand how basic data structures are represented in memory CO2: understand the computational efficiency of the principle algorithms for searching and sorting CO3: apply various data structures using sequential and linked representation CO4: analyze the alternate implementations of data structures to enhance performance CO5: apply different methods for traversing binary trees	
Unit-I	<b>Basic Data Structure, Arrays:</b>
Unit-II	<b>Linked Lists, Stacks:</b>
Unit-III	<b>Queues:</b>
Unit-IV	<b>Trees, Graphs</b>
Unit-V	<b>Sorting and Searching:</b>
<b>Text Books:</b> 1. Data Structures and Algorithms Made Easy by Narasimha Karumanchi 2. Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein. Introduction to Algorithms. McGraw-Hill, 2001. 3. Donald E. Knuth. The Art of Computer Programming, Volumes 1-3. Addison-Wesley Professional, 1998. 4. S.B. Kishor Data Structures, Edition 3. Das Ganu Prakashan, Nagpur, 2008	

<b>Paper Code: BCA-305(A)</b>	<b>(L,4-T,2-P,0)</b>
<b>Paper Name (Elective Paper(1), System Software</b>	<b>Credit-6</b>
<b>Course Outcomes:</b> Through this course student should be able to CO1: apply theoretical foundation of System Software like assembler, linker, loader, CO2: visualize the importance of the System Software in computer machine	
Unit-I	Components of System Software, Evolution of System Software, General Machine Structure (Memory, Register, Data Instructions), Assemblers.
Unit-II	Translators, Interpreters, Brief Description of Different Phases of Computer, Introduction to Linker and Loader.
Unit-III	ROM, BIOS, Booting Process (DOS), introduction to Mouse, Keyboard & Screen Management.
Unit-IV	Introduction to DOS Device Drivers, introduction to Interrupt, Interrupt Processing.
<b>Text Books:</b> 1.J.J. Donovan, “System Programming”, TMH 2.D.M. DhamDhere, “Introduction to System Software”, TMH 3.D.L. Peter, “ An Introduction to Real Time Microcomputer System Design”,TMH 4.Ted. J.Biggerstaf, “ System Software Tools”, Prentice Hall	

<b>Paper Code: BCA-305(B)</b>		<b>(L,4-T,2-P,0)</b>	
<b>Paper Name: Internet of Things (IoT)</b>		<b>Credit-6</b>	
<b>Course Outcomes</b> Through this course student should be able to CO1: understand basic characteristic of IoT. CO2: discuss IoT architectures and protocols. CO3: discuss privacy and security issues. CO4: identify future trends of IoT in real world applications			
<b>Unit-I</b>	<b>IoT and Web Technology:</b> Introduction to IoT, Requirement of IoT, Vision, Challenges, Security, Privacy and trust		
<b>Unit-II</b>	<b>M2M to IoT:</b> Introduction, IoT value chains, Industrial structure for IoT, Sensors, Actuators, Gateways, wireless communication network		
<b>Unit-III</b>	<b>MANET:</b> MANET, IoT Reference model, IoT protocols, Information view, operational view, deployment view, relevant architectures		
<b>Unit-IV</b>	<b>Security and Governance:</b> Privacy and security issues, IoT platforms, Cloud systems, Data Platforms for smart cities.		
<b>Unit-V</b>	<b>Real World IoT applications:</b> IoT applications in health, industry, e-commerce, logistics		
<b>Text Books:</b> 1. “Internet Of Things (Ahands-On-Approach)”Vijay Madiseti Andarshdeep Bahga, Vikas Publishing House 2. Vijay Madiseti, Arshdeep Bahga, “Internet of Things: A Hands-On Approach” 3. Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"			

<b>Paper Code: BCA-305(C)</b>		<b>(L,4-T,2-P,0)</b>
<b>Paper Name: Cyber security and IT Laws</b>		<b>Credit 6</b>
<b>Course Outcomes</b> Through this course student should be able to CO1: identify various symmetric and asymmetric cryptographic algorithms. CO2: enumerate different traditional cryptographic ciphers. CO3: evaluate different approaches to quantifying secrecy. CO4: apply basic concepts in information security, including security policies, security models and security mechanisms for improving the security of computing systems CO5: analyze security at different layers of TCP/IP model		
Unit-I	<b>Computer Security:</b> Introduction, Need for security, Principles of Security, Types of Attacks <b>Cryptography:</b> Plain text and Cipher Text, Substitution techniques, Caesar Cipher, Mono-alphabetic Cipher, Polygram, Polyalphabetic Substitution, Play fair, Hill Cipher, Transposition techniques, Encryption and Decryption, Symmetric and Asymmetric Key Cryptography, Steganography, Key Range and Key Size, Possible Types of Attacks	
Unit-II	<b>Symmetric Key Algorithms and AES:</b> Algorithms types and modes, Overview of Symmetric key Cryptography, Data Encryption Standard (DES), International Data Encryption Algorithm (IDEA), RC4, RC5, Blowfish, Advanced Encryption Standard (AES)	
Unit-III	<b>Asymmetric Key Algorithms, Digital Signatures and RSA:</b> Brief history of Asymmetric Key Cryptography, Overview of Asymmetric Key Cryptography, RSA algorithm, Symmetric and Asymmetric key cryptography together, Digital Signatures, Knapsack Algorithm, Some other algorithms (Elliptic curve cryptography, Megamall, problems with the public key exchange)	
Unit-IV	<b>Digital Certificates and Public Key Infrastructure (PKI):</b> Digital Certificates, Private Key Management, The PKIX Model, Public Key Cryptography Standards (PKCS), XML, PKI and Security, Hash functions, Key Redistribution, Bloom's Scheme, Daffier-Hellman Key Redistribution, Kerberos, Daffier-Hellman Key Exchange, The Station-to-station Protocol.	
Unit-V	<b>Cyber Security, Firewalls and Virtual Private Networks:</b> Brief Introduction to TCP/IP, Cybersecurity, Firewalls, IP Security, Virtual Private Networks (VPN), Intrusion <b>Internet Security Protocols:</b> Basic concepts, Secure Socket Layer (SSL), Transport Layer Security (TLS), Secure Hyper Text Transfer Protocol (SHTTP), Time Stamping Protocol (TSP), Secure Electronic Transaction (SET), SSL vs. SET, 3-D Secure Protocol, Electronic Money, E-mail Security, Wireless Application Protocol (WAP) Security, Security in GSM, Security in 3G. <b>IT Laws and Kerberos:</b> IT Laws, Authentication basics, Passwords, Authentication Tokens, Certificate-based Authentication, Biometric Authentication, Kerberos, Key Distribution Center (KDC) , Security Handshake Pitfalls, Single Sign On (SSO) Approaches	
<b>Text Books:</b> 1. Cryptography and Network Security by AtulKahate, 2nd Edition, Tata Mc. GrawHill 2. Cryptography and Network Security by William Stallings, Fifth Edition, Pearson Education. 3. Cryptography: Theory and Practice by Douglas Stinson, CRC Press, CRC Press LLC.		



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## SEMESTER- IV

<b>Paper Code: BCA-401</b>	<b>(L,0-T,0-P,4)</b>
<b>Paper Name: Industrial Tour/Minor Project</b>	<b>Credit-4</b>
<b>Course Outcomes:</b> Through this course student should be able to CO1: apply the knowledge and skills gained during degree program to generate new knowledge. CO2: identify the rigorous methods to solve problems related to substantial area of study CO3: illustrate the independent and original work of practical importance CO4: simulate real work environment and imparting knowledge on code writing, debugging and report writing in technical work/projects.	
<p>The project should be undertaken preferably individually or by the group of maximum 3 Students who will jointly work and implement the project. The candidate/group will select a project with the approval of the Guide and submit the name of the project with a synopsis of the proposed work of not more than 02 to 08 pages within one month of the starting of the semester. The candidate/ group is expected to complete detailed system design, analysis, data flow design, procurement of hardware and/or software, implementation of a few modules of the proposed work during the semester IV as a part of the term work submission in the form of a joint report.</p> <p>Candidate/group will submit the completed project work in Cobra File to the department at the end of Semester IV as mentioned below.</p> <ol style="list-style-type: none"><li>1. The workable project.</li><li>2. The project report in the bound journal (Cobra file) complete in all respect with the following : -<ol style="list-style-type: none"><li>i) Problem specifications.</li><li>ii) System definition – requirement analysis.</li><li>iii) System design – dataflow diagrams, database design</li><li>iv) System implementation – algorithm, code documentation</li><li>v) Test results and test report.</li><li>vi) In case of object oriented approach – appropriate process be followed.</li></ol></li></ol> <p>The project report should contain a full and coherent account of your work. Although there will be an opportunity to present the work verbally, and demonstrate the software, the major part of the assessment will be based on the written material in the project report. One can expect help and feedback from the project guide, but ultimately it's the candidates own responsibility. The suggestive structure of a project report should be guided by your subject coordinator in selecting the most appropriate format for your project. The work assessment will be done by internal examiners appointed by CA.</p> <p><b>Refer Annexure 1</b></p>	

<b>Rubrics of Assessment</b>	<b>Marks Distribution</b>
Synopsis report	10
Final Project report	40
Project Code and Execution	25
Viva and Presentation	25
<b>Total marks</b>	<b>100</b>

<b>Paper Code: BCA-402</b>		<b>(L,3-T,1-P,4)</b>
<b>Paper Name: Database Management Systems</b>		<b>Credit-4</b>
<b>Course Outcomes:</b> Through this course student should be able to  CO1: understand the database concepts and database management system software. CO2: Identify the basic concepts and various data model used in database design ER modelling concepts and architecture use and design queries using SQL. CO3: Discuss the normalization theory and apply such knowledge to normalization of a database. CO4: Apply and relate the concept of transaction, concurrency control and recovery in database. CO5: Examine recovery system and to be familiar with cloud database and distributed databases.		
Unit-I	<b>Basic Concepts:</b> Purpose of database systems, Components of DBMS, DBMS Architecture, Data Independence, Different Data Models, Various types of constraints.	
Unit-II	<b>Structure of Relational Databases:</b> Relational Databases, Relational Algebra, Views, DDL statements in SQL, DML statements in SQL, JOINS	
Unit-III	<b>Database Design:</b> Design guidelines, Relational database design, Pitfalls in Relational Database Design, Second Normal Form, Third Normal Form, Forth Normal Form, Fifth Normal Form, First Normal Form, Types of dependencies	
Unit-IV	<b>Transaction Processing:</b> Transaction concept, Desirable properties of transactions, Schedules and Recoverability, Serializability of schedules	
Unit-V	<b>Concurrency Control and Recovery:</b> Lock-Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Failure Classification, Buffer Management, Failure with Loss of Nonvolatile Storage, Log based recovery, Shadow paging	
<b>Text Books:</b> 1. Database Systems Concepts By Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Mcgraw Hill Education 2. Fundamentals Of Database Systems By Elmasri And Navathe, Pearson 3. An Introduction To Database Design By C. J. Date, S. Swamynathan, A. Kannan, Pearson		

<b>Paper Code: BCA-403</b>	<b>(L,4-T,2-P,0)</b>
<b>Paper Name: Compiler Design</b>	<b>Credit-6</b>
<b>Course Outcomes:</b> Through this course student should be able to CO1: understand the Compiler and Interpreter. CO2: Understand the grammar and parser.	
<b>Unit I</b>	Introduction of Compilers and Translators, Phases of compiler,
<b>Unit II</b>	Regular Expression: Introduction to Regular expressions, Introduction to Finite State Machines and Push Down Machines
<b>Unit III</b>	Syntax Analysis: Introduction to Grammars, Ambiguity, Classification,
<b>Unit IV</b>	Parser and grammar: Introduction to Parsers, Top Down and Bottom Up, Recursive Descent Parser, Introduction to LL(I) Grammar
<b>UNIT V</b>	Principal Sources of Optimization – Peep-hole optimization – DAG- Optimization of Basic Blocks, Global Data Flow Analysis – Efficient Data Flow Algorithm.
<b>Test Book:</b> 1. Aho&Ulman, Principles of Compiler Design, Narosa Publication 2. Aho&Sethi, Ulman, Compilers: Principles, Techniques & Tools, Addison Wesley 3. Barrat, Eates, et.al. Compiler Construction: Theory & Practice, Galgotia Publication 4. Trembley& Sorenson, Compiler Writing, TMH 5. Allen I Holub, Compiler Design in C, PHI 6. Gries, Compiler Construction for Digital Computer, Johi, Wiley & Sons.	

<b>Paper Code: BCA-404</b>		<b>(L,0-T,0-P,4)</b>
<b>Paper Name: Database Management Systems Lab<sup>#</sup></b>		<b>Credit-2</b>
<b>Course Outcomes:</b> Through this course student should be able to  CO1: understand the database concepts and database management system software. CO2: Identify the basic concepts and various data model used in database design ER modelling concepts and architecture use and design queries using SQL. CO3: Discuss the normalization theory and apply such knowledge to normalization of a database. CO4: Apply and relate the concept of transaction, concurrency control and recovery in database. CO5: Examine recovery system and to be familiar with cloud database and distributed databases.		
Unit-I	<b>Basic Concepts:</b> Purpose of database systems, Components of DBMS, DBMS Architecture, Data Independence, Different Data Models, Various types of constraints.	
Unit-II	<b>Structure of Relational Databases:</b> Relational Databases, Relational Algebra, Views, DDL statements in SQL, DML statements in SQL, JOINS	
Unit-III	<b>Database Design:</b> Design guidelines, Relational database design, Pitfalls in Relational Database Design, Second Normal Form, Third Normal Form, Forth Normal Form, Fifth Normal Form, First Normal Form, Types of dependencies	
Unit-IV	<b>Transaction Processing:</b> Transaction concept, Desirable properties of transactions, Schedules and Recoverability, Serializability of schedules	
Unit-V	<b>Concurrency Control and Recovery:</b> Lock-Based Protocols, Deadlock Handling, Multiple Granularity, Timestamp-Based Protocols, Validation-Based Protocols, Failure Classification, Buffer Management, Failure with Loss of Nonvolatile Storage, Log based recovery, Shadow paging	
<b>Text Books:</b> 1. Database Systems Concepts By Abraham Silberschatz, Henry F. Korth, S. Sudarshan, Mcgraw Hill Education 2. Fundamentals Of Database Systems By Elmasri And Navathe, Pearson 3. An Introduction To Database Design By C. J. Date, S. Swamynathan, A. Kannan, Pearson		

<b>Paper Code: BCA-405(A)</b>		<b>(L,3-T,1-P,0)</b>
<b>Paper Name:(Elective-II)\$, Introduction to Management Information System</b>		<b>Credit-4</b>
Unit-I	Meaning and Role of Management Information System- Introduction, Definition, System's Approach. Development of Organizational Theory, Management & Organizational Behaviour, Management, Information & System Approach.	
Unit-II	Data Processing- Operation of Manual Information System, Components of Computer System, Conversion of Manual to Computer Based Systems, Data Bank Concept, Types of Computer Based Applications. Information System for Decision Making- Evolution of Information System, Decision Making & Management Information System.	
Unit-III	Strategic & Project Planning for Management Information System- Business Planning, Management Information System Responses, Management Information System Planning- General & Details.	
Unit-IV	Conceptual System Design- Define Problem, Set System Objective, Establish System Constraints, Determine Information Needs & Sources, Develop Alternative Conceptual Design & Documentation, Prepare the Design Report.	
Unit-V	Detailed System Design- Aim, Project Management, Define Subsystem, Input, Output & Process Design, System Testing, Software & Hardware selection, Documentation of Detailed Design. Pitfalls in Management Information Systems.	
<b>Text Books:</b> 1. Robert G. Murdick, Joel E. Ross, James R. Claggett, Information System for Modern Management. 2. SurendraBasandra,Computers Today		

Paper Code: BCA-405(B)		(L,3-T,1-P,0)
Paper Name: Fundamental of Web Development		Credit-4
Project Outcomes: Through this course student should be able to CO1: Understand html commands and web page development. CO2: Analyze CSS applications and usages. CO3: Develop applications using Javascript and HTML.		
Unit-I	HTML:Introduction to HTML, HTML commands, DIV, SPAN, Background colour, HTML tables, Paragraph, HTML Links, Attributes and commands	
Unit-II	Cascading Style Sheets: CSS introduction, internal and external CSS, inline CSS, develop application using CSS	
Unit-III	Javascript: Basic functions, commands, controls, application using Javascript	
Unit-IV	Bootstrap: Introduction and Basic Concepts, Website creation using bootstrap, Web page creation, animation, sound controls, github	
Unit-V	Web page applications for different application like e-commerce, hospitality, medical, logistics, food and safety	
Text books: 1. Introduction to HTML, CSS and Javascript, Black Book, TMH		

<b>Paper Code: BCA-405(C)</b>		<b>(L,3-T,1-P,0)</b>
<b>Paper Name: Introduction to Artificial Intelligence</b>		<b>Credit-4</b>
<b>Course Outcomes:</b> Through this course student should be able to CO1: apply theoretical foundation of AI. CO2: apply the theoretical foundation of searching and expert system		
Unit-I	<b>Artificial Intelligence:</b> Introduction to AI, Definition, Historical Overview, Growth, Turing Test.	
Unit-II	<b>State Searching:</b> Informed and Uninformed (blind) Searches-DFS, BFS.	
Unit-III	<b>Knowledge Representation:</b> Introduction to Propositional Logic, Introduction to First Order Predicate, Introduction to Expert Systems.	
Unit-IV	<b>Machine learning:</b> Neural network, decision tree, support vector machine.	
Unit-V	Machine Learning, Supervised and Unsupervised learning, Reinforcement learning, Clustering,	
<b>Text Books:</b> 1. Elaine, Rich & K. Knight, Artificial Intelligence, TMH Publication 2. N.J. Nilson, Principles of Artificial Intelligence, Narosa Publication		
<b>Reference Book:</b> 1. Russell &Norvig, Artificial Intelligence: A modern Approach, Pearson Education, 2013 2. E.Charniak& D. Mc Dermott, Introduction to AI, Addison Wesley 3. Avron Barr & Edward A, Feigenbaum the Handbook of Artificial Intelligence, Addison Wesley-Longman 4. James Allen, Natural Language Understanding, Pearson. 5. Peter Jackson, Introduction to Experts System, Addison Wesley 6. Tau &Genzales, pattern Recognition Principles, Addison Wesley.		

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**SEMESTER-V**



## SEMESTER-V

<b>Paper Code: BCA-501</b>		<b>(L,3-T,1-P,0)</b>	
<b>Paper Name: Concepts of Java Programming</b>		<b>Credit-4</b>	
<b>Course Outcomes:</b> Through this course student should be able to CO1: define the structure and model of the Java programming language CO2: understand the accessibility of fields and methods of an object through String and StringBuilder classes CO3: analyze object serialization with file handling and exception handling to overcome run-time errors CO4: evaluate user requirements for software functionality and assess its implementation in java			
<b>Unit-I</b>	<b>The Origin of Java-</b> Java’s Lineage (Ancestry), The Creation of Java, Java and Internet, Java’s Magic: The Byte-code, The Java Features, The Java Environment, Java Program Development, Object Oriented Programming in Java, Java Program Structure and Java’s Class Library. Java is Strongly Typed Language, The Simple Data Types, Literal, Variables, Type Conversion and Casting, Automatic Type, Promotion in Expressions, Java Operators, and Operator Precedence, Making Decisions, Logical Operations, The SWITCH statement, Variable Scope, Loops, Jump Statements		
<b>Unit-II</b>	<b>Defining Classes-</b> Introduction to a Class, Defining Classes, Defining Methods, Constructors, CreatingObjects of a Class, Assigning Object Reference Variables, variable this, Defining andUsing a Class, Automatic Garbage Collection. <b>Arrays and Strings-</b> Arrays, Arrays of Characters, String Handling Using String Class, String Handling UsingStringBuffer Class, Operations on Immutable Strings, Operations on Mutable Strings. <b>Extending Classes and Inheritance-</b> Encapsulation, Using Existing Classes, Class Inheritance, Choosing Base Class, AccessAttributes, Polymorphism, Multiple Levels of Inheritance, Abstraction through Abstract Classes, Using Final Modifier, and The Universal Super-class – Object Class		
<b>Unit-III</b>	<b>Interfaces-</b> Defining an Interface, Implementing Interfaces, ApplyingInterfaces, and Multiple Inheritance using Interfaces. <b>Exception Handling-</b> The Idea behind Exceptions, Types of Exceptions, Dealing with Exceptions, ExceptionObjects, Defining Your Own Exceptions. <b>Multithreading Programming-</b> Introduction of Java Thread, Creating Multiple Threads, Thread Priorities,Synchronization, Inter-thread Communication, Deadlocks.		
<b>Unit-IV</b>	<b>Input and Output-</b> Files and Directories, Character Streams, Buffered Character Streams, The Print WriterClass, Byte Streams, Random Access Files. <b>Applets-</b> An Overview Of Applets, The Life Cycle Of An Applet, The Graphics Class, Colors, Text,Applet Dimensions, Applets In Web Page, The Applet Class, The AppletContextClass,Images, Threads, Double Buffering		
<b>Unit-V</b>	<b>Handling Events in Java-</b> Two Event Handling Mechanisms, The Delegation Event Model, The Event HandlingProcess, Event Classes, Sources of Events, Event Listener Interfaces, Using the DelegationEvent Model, Adapter Classes <b>Working with Graphics, Texts &amp; Abstract Window Toolkit-</b> Working with Graphics, Working with Color, Setting the Paint Mode, Working with Fonts,Managing Text Output Using FontMetrics, Exploring Text and Graphics, Labels, Buttons,Canvases, Check Boxes, Check Box Groups, Choices, Text Fields and Text Areas, Lists,Scroll Bars, Layout Managers, Border Layout, Grid Layout and Inserts, Panels, Windowsand Frames, Menus and Menu Bars, Dialogs and File Dialogs		

**Text Books:**

1. Java EE 6 for Beginners, Sharanam Shah, Vaishali Shah, SPD (Unit II to VI)
2. Core Java Vol. II – Advanced Features, Cay S. Horstmanns, Gary Coronell, Eight Edition,
3. Java Complete Reference, Herbert Schildt, Seventh Edition, TMH.

<b>Paper Code: BCA-502</b>		<b>(L,3-T,1-P,2)</b>
<b>Paper Name: Fundamentals of Computer Graphics</b>		<b>Credit-6</b>
Unit-I	<b>Introduction:</b> what is computer graphics, Elements of graphics workstation, Video Display Devices- Raster, Random, Input devices, Graphics Software Coordinate Representations, Fundamental problems in Geometry, Plotters, printers, digitizers, Light pens etc, Active & Passive graphics devices; Computer graphics software.	
Unit-II	<b>Scan Conversion:</b> Points & lines, Line drawing algorithms; DDA algorithm, Bresenham's line algorithm, Circle generation algorithm; Ellipse generating algorithm; scan line polygon, fill algorithm, boundary fill algorithm, flood fill algorithm..	
Unit-III	<b>2D Transformation:</b> Basic transformations: translation , rotation, scaling ; Matrix representations & homogeneous coordinates, transformations between coordinate systems; reflection shear; Transformation of points, lines , parallel lines, intersecting lines. Viewing pipeline, Window to viewport co-ordinate transformation, clipping operations, point clipping, line clipping, clipping circles, polygons & ellipse.	
Unit-IV	<b>3D Transformation:</b> 3D transformations: translation, rotation, scaling & other transformations. Rotation about an arbitrary axis in space, reflection through an arbitrary plane; general parallel projection transformation; clipping, viewport clipping, 3D viewing.	
Unit-V	<b>Hidden Surface:</b> Depth comparison, Z-buffer algorithm, Back face detection, BSP tree method, the Printer's algorithm, scan-line algorithm; Hidden line elimination, wire frame methods , fractal - geometry.	
<b>Text Books:</b> 1. Computer Graphics, Donald Hearn & M. Pauline Baker, PHI 2. Computer Graphics by Hill Jr 3. Computer Graphics, Steven Harrington, McGraw-Hill		

<b>Paper Code: BCA-503</b>	<b>(L,0-T,0-P,4)</b>
<b>Paper Name: Technical Writing and Seminar</b>	<b>Credit-2</b>
The technical writing of research paper either review or application should be undertaken preferably individually or by the group of maximum 3 Students who will jointly work and implement the concepts mentioned in research papers. The candidate/group will select a project with the approval of the Guide and submit the name of the project with a synopsis of the proposed work of not more than 02 to 08 pages within one month of the starting of the semester. The candidate/ group is expected to complete detailed system design, analysis, data flow design, procurement of hardware and/or software, implementation of a few modules of the proposed work during the semester as a part of the term work submission in the form of a IEEE/APA style report format.	
<b>Rubrics of Assessment</b>	<b>Marks Distribution</b>
Synopsis report	5
Problem Identification	5
Literature Review	15
Research Methodology	15
Results and Conclusion	10
<b>Total marks</b>	<b>50</b>

<b>Paper Code: BCA-504</b>		<b>(L,0-T,0-P,4)</b>	
<b>Paper Name: Java Programming Lab<sup>#</sup></b>		<b>Credit-2</b>	
<b>Course Outcomes:</b> Through this course student should be able to CO1: define the structure and model of the Java programming language CO2: understand the accessibility of fields and methods of an object through String and StringBuilder classes CO3: analyze object serialization with file handling and exception handling to overcome run-time errors CO4: evaluate user requirements for software functionality and assess its implementation in java			
<b>Unit-I</b>	The Origin of Java		
<b>Unit-II</b>	Defining Classes Arrays and Strings Extending Classes and Inheritance		
<b>Unit-III</b>	Interfaces Exception Handling Multithreading Programming		
<b>Unit-IV</b>	Input and Output, Applets		
<b>Unit-V</b>	Handling Events in Java- Working with Graphics, Texts & Abstract Window Toolkit-		
<b>Text Books:</b> 1. Java EE 6 for Beginners, Sharanam Shah, Vaishali Shah, SPD (Unit II to VI) 2. Core Java Vol. II – Advanced Features, Cay S. Horstmans, Gary Coronell, Eight Edition, 3. Java Complete Reference, Herbert Schildt, Seventh Edition,TMH.			

<b>Paper Code: BCA-505(A)</b>		<b>(L,3-T,1-P,0)</b>
<b>Paper Name: Concepts of Data Mining and Warehouse</b>		<b>Credit-4</b>
<b>Unit-I</b>	<b>Introduction:</b> Fundamentals of data mining, Data Mining Functionalities, Classification of Data Mining systems, Major issues in Data Mining. <b>Data Preprocessing:</b> Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.	
<b>Unit-II</b>	Data Warehouse and OLAP Technology for Data Mining Data Warehouse, Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Further Development of Data Cube Technology, From Data Warehousing to Data Mining.	
<b>Unit-III</b>	<b>Concepts Description : Characterization and Comparison :</b> Data Generalization and Summarization- Based Characterization, Analytical Characterization: Analysis of Attribute Relevance, <b>Mining Class Comparisons:</b> Discriminating between Different Classes, Mining Descriptive Statistical Measures in Large Databases.	
<b>Unit-IV</b>	<b>Mining Association Rules in Large Databases :</b> Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining.	
<b>Unit-V</b>	<b>Classification and Prediction:</b> Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back	

	propagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods, Prediction, Classifier Accuracy. <b>Cluster Analysis Introduction :</b> Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.
<b>Text Books:</b> <ol style="list-style-type: none"> <li>1. S. Prabhu , N. Venkatesan“Data Mining &amp; Warehousing – New Age International – First Edition”, New Delhi 2006.</li> <li>2. Sam Anahory , Dennis Murray, “Data Warehousing in real world – Pearson Education”, New Delhi 2004.</li> <li>3. Pieter Adriaans ,DolfZantinge, “Data Mining – Pearson education”, New Delhi 2005.</li> <li>4. Alex Berson, Stephen J.Smith”Data Warehousing, Data mining &amp; OLAP – Tata McGraw Hill Publications”, New Delhi 2004.</li> </ol>	

<b>Paper Code: BCA-505(B)</b>		<b>(L,3-T,1-P,0)</b>
<b>Paper Name: Data Analytics</b>		<b>Credit-4</b>
<b>Unit-I</b>	<b>Introduction:</b> Fundamentals of data analytics, Types of Data, data collection principles, data representation: table, visual, diagrams, <b>Data Preprocessing:</b> Needs Preprocessing the Data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.	
<b>Unit-II</b>	<b>Statistical measures:</b> Mean, median, mode, measure of dispersion, measure of asymmetry, Excel workbook controls and operations	
<b>Unit-III</b>	<b>Probability Distributions:</b> Discrete and continuous variables, normal distribution, fundamentals of hypothesis, type-1 and type-2 errors.	
<b>Unit-IV</b>	ANOVA, ANCOVA, measure of relationship, Correlation and Regression, ordinary least square, ridge regression, lasso regression,	
<b>Unit-V</b>	<b>Classification and Prediction:</b> Issues Regarding Classification and Prediction, Classification by Decision Tree Induction, Bayesian Classification, Classification by Back propagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods, Prediction, Classifier Accuracy. <b>Cluster Analysis Introduction :</b> Types of Data in Cluster Analysis, A Categorization of Major Clustering Methods, Partitioning Methods, Density-Based Methods, Grid-Based Methods, Model-Based Clustering Methods, Outlier Analysis.	
<b>Text Books:</b> 1. RESEARCH METHODOLOGY PANNEERSELVAM, R. NEW DELHI: PSI LEARNING PVT. LTD. 2. RESEARCH METHODOLOGY KOTHARI, C. R NEW AGE INTERNATIONAL		

<b>Paper Code: BCA-505(C)</b>		<b>(L,3-T,1-P,0)</b>	
<b>Paper Name: Robotics</b>		<b>Credit-4</b>	
<b>Unit-I</b>	<b>Introduction:</b> Fundamentals of Robotics, Types of Robots, Intelligent agents, Structure of agents, Emulation of human cognitive process, Introduction to genetic algorithm, fuzzy logic		
<b>Unit-II</b>	<b>Search methods:</b> Problem definition formulation, searching for solutions, measuring problems, search strategies, search methods		
<b>Unit-III</b>	<b>Probability Distributions:</b> Discrete and continuous variables, normal distribution, fundamentals of hypothesis, type-1 and type-2 errors.		
<b>Unit-IV</b>	Robot perception, localization, mapping, cell decomposition methods, skeletonization methods, planning uncertain movements, dynamics and control		
<b>Unit-V</b>	Robotics software architecture, Robotic programming, flex pendant, robot controller, coordinate system of robot, robot programming functions, jogging types, effectors and sensors		
<b>Text Books:</b> 1. INDUSTRIAL ROBOTICS MIKELL P, GROOVER, ODREY, WEISS, NAGEL, DUTTA. MC GRAW HILL 2. ROBOTS AND MANUFACTURING AUTOMATION, C. RAY ASFAHL WILEY			

<b>Paper Code: BCA-506</b>		<b>(L,0-T,0-P,4)</b>	
<b>Paper Name: Minor Project</b>		<b>Credit-2</b>	
<b>Objectives</b>	To carry out a small scale project to develop hands-on experience of working in a project. During the course, the student will also develop knowledge of application development platforms and tools (Java /C# dotnet / Visual C++/PHP or any platform of current trend). The students will learn working as a team and basic collaboration and project management skills. The student will also learn about formulating project documentations.		
	Project ideas and proposal guidance Application development a. Visual programming (object oriented) i. Language basics ii. Frameworks and APIs b. Programming basics and design patterns Project management, team work and collaboration i. Project management techniques ii. Collaborative development environment Project guidance, Project work,Project documentation guidance		
	<b>Rubrics of Assessment</b>		<b>Marks Distribution</b>
	Synopsis report		5
	Problem Identification and Project Ideas		10
	Application Development		20
	Report Writing and Submission		15
	<b>Total marks</b>		<b>50</b>

**Detailed Syllabi**  
**BCA**  
**SEMESTER-VI**

<b>Paper Code</b>	<b>BCA-601 (0-0-24) credit 12</b>
<b>Paper Name</b>	<b>Major Project Report</b>

### Course Outcomes:

Through this course student should be able to:

CO1: integrate and synthesize prior knowledge and learning from multiple diverse topic areas.

CO2: develop ability to draw reasonable inferences from observations and learn to formulate and solve new problems using analytical and problem-solving skills.

CO3: identify the intricacies involved in solution design to real world problems.

CO4: illustrate and instil the importance of teamwork while building solutions to real world problems.

The project should be undertaken preferably individually or by the group of maximum 3 Students who will jointly work and implement the project. The candidate/group will select a project with the approval of the Guide and submit the name of the project with a synopsis of the proposed work of not more than 02 to 08 pages within one month of the starting of the semester. The candidate/ group is expected to complete detailed system design, analysis, data flow design, procurement of hardware and/or software, implementation of a few modules of the proposed work during the semester VI as a part of the term work submission in the form of a joint report.

Candidate/group will submit the completed project work (Hard Copy Binding) to the department at the end of Semester VI as mentioned below.

1. The workable project.
2. The project report in the bound journal complete in all respect with the following: -
  - i) Problem specifications.
  - ii) System definition – requirement analysis.
  - iii) System design – dataflow diagrams, database design
  - iv) System implementation – algorithm, code documentation
  - v) Test results and test report.
  - vi) In case of object-oriented approach – appropriate process be followed.

**Nature of Hard Copy Binding: The Binding should be in Black color with golden text print on front page.**

The project report should contain a full and coherent account of your work. Although there will be an opportunity to present the work verbally, and demonstrate the software, the major part of the assessment will be based on the written material in the project report. One can expect help and feedback from the project guide, but ultimately, it's the candidates own responsibility. The suggestive structure of a project report should be guided by your subject coordinator in selecting the most appropriate format for your project. The work assessment will be done jointly by internal and external examiners appointed by CA.

<b>Rubrics of Assessment</b>	<b>Marks Distribution</b>
Synopsis report	50
Final Project report	150
Project Code and Execution	200
Presentation Skills	100
External Viva	100
<b>Total marks</b>	<b>600</b>
<b>Rubrics of External Viva Assessment</b>	<b>Marks Distribution (100)</b>
Problem Statement	20
Project Design	20
Coding	20
Effectiveness	20
Presentation and Q/A	20
<b>Total marks</b>	<b>100</b>

## Refer Annexure II

<b>Paper Code</b>	<b>BCA-602 (0-0-16) credit 08</b>																
<b>Paper Name</b>	<b>Presentation and viva voice of Major Project</b>																
<b>Course Outcomes:</b> Through this course student should be able to: CO1: integrate and synthesize prior knowledge and learning from multiple diverse topic areas. CO2: develop ability to draw reasonable inferences from observations and learn to formulate and solve new problems using analytical and problem-solving skills. CO3: identify the intricacies involved in solution design to real world problems. CO4: illustrate and instil the importance of teamwork while building solutions to real world problems.																	
The <b>Presentation and viva voice</b> should be undertaken preferably individually or by the group of maximum 3 Students (involved in same Major project).																	
The major content of presentation will be comprised of : i) Problem specifications. ii) System definition – requirement analysis. iii) System design – dataflow diagrams, database design iv) System implementation – algorithm, code documentation v) Test results and test report. vi) In case of object-oriented approach – appropriate process be followed.																	
The weightage of presentation and viva voice both components are same.																	
<table><tr><th><b>Rubrics of Assessment</b></th><th><b>Marks Distribution</b></th></tr><tr><td>Synopsis report</td><td>50</td></tr><tr><td>Final Project report</td><td>150</td></tr><tr><td>Project Code and Execution</td><td>200</td></tr><tr><td>Presentation Skills</td><td>100</td></tr><tr><td>External Viva</td><td>100</td></tr><tr><td><b>Total marks</b></td><td><b>600</b></td></tr><tr><td></td><td></td></tr></table>		<b>Rubrics of Assessment</b>	<b>Marks Distribution</b>	Synopsis report	50	Final Project report	150	Project Code and Execution	200	Presentation Skills	100	External Viva	100	<b>Total marks</b>	<b>600</b>		
<b>Rubrics of Assessment</b>	<b>Marks Distribution</b>																
Synopsis report	50																
Final Project report	150																
Project Code and Execution	200																
Presentation Skills	100																
External Viva	100																
<b>Total marks</b>	<b>600</b>																



## **Annexure 1**

### **Minor Project Report Format**

1. Cover Page
2. Inner Pages
  - a) Certificate by Company/Industry/Institute
  - b) Declaration by student
  - c) Acknowledgement
3. About Company/Industry/Institute
4. Table of Contents
5. List of Tables
6. List of Figures
7. Abbreviations and Nomenclature (If any)
8. Chapters
  - 1 Introduction to Project
  - 2 Tools & Technology Used
  - 3 Snapshots
  4. Results and Discussions
  5. Conclusions and Future Scope
9. References
10. Data Sheet (If any)
11. Appendices (If any)

## **INSTRUCTIONS FOR MINOR PROJECT REPORT**

1. A chapter may be further divided into several divisions and sub-divisions depending on type & volume of work. This contains the text & related to hardware & software implementation.
2. The report must be submitted in Three Copies (one for department, one for Supervisor and one for library) duly signed by the HOD. Students should also submit the soft copy on CD in PDF and word format in the Department (2 Copies of CD).
3. The length of the training report may be about 40 to 70 page.
4. The training report shall be computer typed (English- British, Font - Times Roman, Size-12 point) and printed on A4 size paper.
5. The training report shall be hard bound with cover page in **Maroon(B.Sc.-IT), Navy blue (BCA Program)**. The name of the students, degree, duration of training period, name of the university including institute name shall be printed in **Golden** letters on the cover page.
6. The report shall be typed with 1.5 line spacing with a margin 3.5 cm on the left, 2.5 cm on the top, and 1.25 cm on the right and at bottom. Every page in the report must be numbered. The page numbering, starting from acknowledgements and till the beginning of the introductory chapter, should be printed in small Roman numbers, i.e, i, ii, iii, iv..... The page number of the first page of each chapter should not be printed (but must be accounted for). All page numbers from the second page of each chapter should be printed using Arabic numerals, i.e. 2,3,4,5... All printed page numbers should be located at the bottom centre of the page.
7. In the report, the title page should be given first and printed in black letters.
8. **The table of contents** should list all headings and sub-headings. The title page and certificates will not find a place among the items listed in the Table of Contents. One and a half line spacing should be adopted for typing the matter under this head.
9. **The list of tables** should use exactly the same captions as they appear above the tables in the text. One and a half spacing should be adopted for typing the matter under this head.

10. **The list of figures** should use exactly the same captions as they appear below the figures in the text. One and a half spacing should be adopted for typing the matter under this head.

11. The list of symbols, abbreviation & nomenclature should be typed with one and a half line spacing. Standard symbols, abbreviation etc. should be used.

12. Subject matter must be typed on single side of the page.

13. All the pages must be numbered properly

# MINOR PROJECT REPORT

(Times New Roman, 24 pt. Bold)

## **TITLE OF THE Project**

(Times New Roman, 16 pt. Bold)

Submitted in partial fulfillment of the

Requirements for the award of

**Degree of Bachelor of Computer Applications**



Submitted By (14 size)

Name: \_\_\_\_\_

University Roll No. \_\_\_\_\_

(Times New Roman, 14 pt. Bold)

**SUBMITTED TO:**

**Department of Computer Science(16 sizes)**

**BBASAHEB BHIMRAO AMBEDKAR UNIVERSITY**

**SATELLITE CENTER**

**TIKARMAFI AMETHI ,INDIA**

## **DECLARATION (16 Times New Roman)**

I hereby declare that the minor project Report entitled ("Title of the project") is an authentic record of my own work as requirements for the award of degree of Bachelor of Science – Information Technology, BabasahebBhimraoAmbedkar University satellite Campus (A Central University) Amethi, under the guidance of (Name of Project Guide).

**(12 size)**

**(Signature of student)**

**(Name of Student)**

**University Roll No.**

**Mobile No.**

**Email ID:**

**Date:** \_\_\_\_\_

Certified that the above statement made by the student is correct to the best of our knowledge and belief.

**Signature of Supervisor**

**Signature of Examiner**

# **CERTIFICATE**

(16 Times New Roman, bold)

This is to certify that Mr. / Ms. \_\_\_\_\_ has partially completed /

Completed / not completed the 6-Month Minor Project during the semester from July to December of Academic session 2018-19, to in our Organization / Industry as a Partial Fulfillment of degree of Bachelor of Science – Information Technology. He / She was trained in the field of

\_\_\_\_\_ .

**Signature & Seal of Training Manager or Supervisor**

**Note: This certificate must be typed on the company/University letterhead.**

## **Annexure II**

### **Major Project Report Format**

1. Cover Page
2. Inner Pages
  - Certificate by Company/Industry/Institute
  - Declaration by student
  - Acknowledgement
3. Table of Contents
4. List of Tables
5. List of Figures
6. Abbreviations and Nomenclature (If any)
- Chapters
  - Introduction to Project
  - Tools & Technology Used
  - Snapshots
  - Results and Discussions
  - Conclusions and Future Scope

References

Data Sheet (If any)

Appendices (If any)

## **INSTRUCTIONS FOR MAJOR PROJECT REPORT**

1. A chapter may be further divided into several divisions and sub-divisions depending on type & volume of work. This contains the text & related to hardware & software implementation.
2. The report must be submitted in Three Copies (one for department, one for Supervisor and one for library) duly signed by the HOD. Students should also submit the soft copy on CD in PDF and word format in the Department (2 Copies of CD).
3. The length of the major report may be about 70 to 100 page.
4. The training report shall be computer typed (English- British, Font - Times Roman, Size-12 point) and printed on A4 size paper. The training report shall be hard bound with cover page in **Maroon(B.Sc.-IT), Black (BCA Program)**. The name of the students, degree, duration of training period, name of the university including institute name shall be printed in **Golden** letters on the cover page.
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11. Subject matter must be typed on single side of the page.
12. All the pages must be numbered properly.



# MAJOR PROJECT REPORT

(Times New Roman, 24 pt. Bold)

## **TITLE OF THE Project**

(Times New Roman, 16 pt. Bold)

Submitted in partial fulfilment of the

Requirements for the award of

## **Degree of Bachelor of Computer Applications**



Submitted By (14 size)

Name: \_\_\_\_\_

University Roll No. \_\_\_\_\_

(Times New Roman, 14 pt. Bold)

## **SUBMITTED TO:**

**Department of Computer Science (16 size)**

**BBASAHEB BHIMRAO AMBEDKAR UNIVERSITY**

**SATELLITE CENTER**

**TIKARMAFI AMETHI, INDIA**

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**(12 size)**

**(Signature of student)**

**(Name of Student)**

**University Roll No.**

**Mobile No.**

**Email ID:**

**Date:** \_\_\_\_\_

Certified that the above statement made by the student is correct to the best of our knowledge and belief.

**Signature of Supervisor**

**Signature of Examiner**

# **CERTIFICATE**

(16 Times New Roman, bold)

This is to certify that Mr. / Ms. \_\_\_\_\_ has partially completed /

Completed / not completed the 6-Month Minor Project during the semester from July to December of Academic session 2018-19, to in our Organization / Industry as a Partial Fulfillment of degree of Bachelor of Science – Information Technology. He / She was trained in the field of \_\_\_\_\_ .

BBAU

**Signature & Seal of Supervisor**

BBAU