



**MAHARAJA KRISHNAKUMARSINHJI BHAVNAGAR UNIVERSITY**  
**NAAC Accreditation Grade "B"**  
**(With effect from Academic Year: 2017-18)**

**BACHELOR OF COMPUTER APPLICATIONS (B.C.A.)**

Structure for B.C.A. – CBCS Programme

**Semester-III (SY)**

<b>COURSE NO.</b>	<b>COURSE TYPE</b>	<b>SUBJECT</b>	<b>CREDIT</b>
BCA-EC-301	ELECTIVE		02
BCA-FC-301	FOUNDATION		02
BCA-CC-301	CORE	Operating System	03
BCA-CC-302	CORE	Data and File Structure	03
BCA-CC-303	CORE	Object Oriented Programming with C++	03
BCA-CC-304	CORE	System Analysis and Design	03
BCA-CC-305	CORE	Practical (Based on BCA-CC-302 & BCA-CC-303)	12
<b>TOTAL</b>			<b>28</b>

Internal Continuous Evaluation:

1. There will be Internal Continuous Evaluation in Theory papers of Core Course.
2. There will be 30 marks for Assignments in Course No: BCA-CC-301, BCA-CC-302, BCA-CC-303, BCA-CC-304



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<b>B.C.A.</b>	<b>Course:</b> Operating System	<b>Course No:</b> BCA-CC-301	
<b>Semester:</b> 03	<b>Type of Course :</b> Core Course		
<b>Marking Scheme:</b> External Examination: 70 + Internal Examination: 30 = 100			
<b>Credits:</b> 03	<b>Theory Sessions per Week:</b> 03	<b>Teaching Hours:</b> 45 Hours	
Unit	Detailed Syllabus	Teaching Hours	Marks/Weight
<b>Unit-1</b>	<b>Basic concept of an operating system</b>	<b>9</b>	<b>14</b>
	<ul style="list-style-type: none"><li>- Definition and Function of operating systems.</li><li>- Evolution of operating system: Batch system, Multi programmed system, time sharing and PCs.</li><li>- Introduction to basic terms &amp; batch processing system: Jobs, Processes files, command interpreter.</li><li>- Different types of operating system-real time systems, parallel, distributed system.</li><li>- Operating system structure-monolithic layered, virtual machine &amp; Client server.</li></ul>		
<b>Unit-2</b>	<b>Process Management</b>	<b>9</b>	<b>14</b>
	<ul style="list-style-type: none"><li>- Processes: Definition, Process States , Process Control Block ,Context switching.</li><li>- Process Scheduling: Definition, Scheduling objectives.</li><li>- Types of Schedulers ,Scheduling criteria : CPU utilization, Throughput, Turnaround Time, Waiting Time, Response Time (Definition only) ,</li><li>- Scheduling algorithms : Pre emptive and Non , pre emptive , FCFS – SJF – RR</li></ul>		
<b>Unit-3</b>	<b>Deadlocks and Threads</b>	<b>9</b>	<b>14</b>
	<ul style="list-style-type: none"><li>- Definition, Deadlock characteristics, Deadlock Prevention.</li><li>- Introduction of Deadlock Avoidance: banker's algorithm and problem solving,</li><li>- Deadlock detection and Recovery.</li><li>- Threads - Concept of multithreads, Benefits of threads – Types of threads.</li></ul>		
<b>Unit-4</b>	<b>Memory Management – I Basic Memory Management</b>	<b>9</b>	<b>14</b>
	<ul style="list-style-type: none"><li>- Definition, Logical and Physical address Map.</li><li>- Memory allocation: Contiguous Memory allocation – Internal and External fragmentation.</li><li>- Paging: Principle of operation – Page allocation – Hardware support for paging – Protection and sharing – Disadvantages of paging.</li></ul>		
<b>Unit-5</b>	<b>Memory Management – II Virtual Memory</b>	<b>9</b>	<b>14</b>
	<ul style="list-style-type: none"><li>- Segmentation.</li><li>- Introduction to Virtual Memory.</li><li>- Page Replacement policies, Optimal (OPT) , First in First Out (FIFO), Least Recently used (LRU)</li></ul>		
<b>Reference Books</b>			
<ol style="list-style-type: none"><li>1. Silberschatz, Galvin and Gange: Operating System Concepts, Wesley.</li><li>2. Tanenbaum A.S., "Modern Operating Systems", 4th Edition, PHI, 2001</li><li>3. Stalling W, "Operating Systems", 6th edition, Prentice Hall India.</li></ol>			



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<b>B.C.A.</b>	<b>Course:</b> Data and File Structure	<b>Course No:</b> BCA-CC-302	
<b>Semester:</b> 03	<b>Type of Course :</b> Core Course		
<b>Marking Scheme:</b> External Examination: 70 + Internal Examination: 30 = 100			
<b>Credits:</b> 03	<b>Theory Sessions per Week:</b> 03	<b>Teaching Hours:</b> 45 Hours	
Unit	Detailed Syllabus	Teaching Hours	Marks/Weight
<b>Unit-1</b>	<b>Introduction to Data Structure and Sorting Techniques</b>	<b>09</b>	<b>14</b>
	<ul style="list-style-type: none"> <li>- Definition of Data Structure, Classification of Data Structure (Linear, Non Linear)</li> <li>- Applications, Aims and Goals of Data Structure, Sparse Matrix.</li> <li>- Representation of Array in Memory: Row-Major and Column-Major order.</li> <li>- Address calculation of elements of one and two-dimensional arrays.</li> <li>- Sorting and Merging Methods: Insertion Sort, Shell Sort, Quick Sort, Merge Sort.</li> </ul>		
<b>Unit-2</b>	<b>Linear Data Structure : Doubly Linklist</b>	<b>09</b>	<b>14</b>
	<ul style="list-style-type: none"> <li>- Introduction to Linked list and its types.</li> <li>- Introduction of Doubly Linked list.</li> <li>- Advantages and Disadvantages of Doubly linked list.</li> <li>- Application of Doubly linked list.</li> <li>- Different between single and double link list.</li> <li>- Operation on Doubly Linked list.(insert, update, delete, display Algorithm and program)</li> </ul>		
<b>Unit-3</b>	<b>Linear Data Structure: Stack</b>	<b>09</b>	<b>14</b>
	<ul style="list-style-type: none"> <li>- Definition of Stack, Applications of Stack.</li> <li>- Stack Operations using Array (Push, Pop, Peep, Display)</li> <li>- Stack Operations using Linked List (Push, Pop, Peep, Display) (Algorithm and Program of All Stack Operations using Array and Linked List)</li> <li>- Polish Notation: Conversion of Expression (Prefix, Infix, Postfix) ( using hand or stack method)</li> </ul>		
<b>Unit-4</b>	<b>Linear Data Structure: Queue</b>	<b>09</b>	<b>14</b>
	<ul style="list-style-type: none"> <li>- Definition of Queue, Applications of Queue.</li> <li>- Queue Operations using Array (Insert, Update, Delete, Display)</li> <li>- Queue Operations using Linked List (Insert, Update, Delete, Display) (Algorithm and Program of All Queue Operations using Array and Linked List)</li> <li>- Circular Queue using Array.</li> <li>- Concept of Priority Queue and Double Ended Queue.</li> </ul>		
<b>Unit-5</b>	<b>Non Linear Data Structure: Tree and Graph</b>	<b>09</b>	<b>14</b>
	<ul style="list-style-type: none"> <li>- Concept of Binary Tree, Representation of Binary Tree: Sequential and Linked List.</li> <li>- Types of Binary Tree : Strictly, Full, Complete, in complete,</li> <li>- Creation of Binary Tree - Binary Tree Traversal : Pre order, In order, Post order (using recursion)</li> <li>Definition of Graph and its terminologies</li> <li>- Representation of Graph : Adjacency Matrix, Adjacency List</li> <li>Definition of Tree, Basic Tree Terminology (Root, Node, Degree of Node, Degree of Tree, Leaf Node, Non Terminal Node, Siblings, Level of Tree, Edge, Path, Depth, Forest)</li> </ul>		
<b>Reference Books</b>			
<ol style="list-style-type: none"> <li>1. Data and File Structure: Trembly &amp; Sorenson.</li> <li>2. Expert in Data Structure With C: R.B.Patel.</li> <li>3. Data Structure using C: Aaron M. Tenenbaum.</li> <li>4. Data Structure through C: G.S.Baluja</li> </ol>			



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<b>B.C.A.</b>	<b>Course:</b> Object Oriented Programming with C++	<b>Course No:</b> BCA-CC-303	
<b>Semester:</b> 03	<b>Type of Course :</b> Core Course		
<b>Marking Scheme:</b> External Examination: 70 + Internal Examination: 30 = 100			
<b>Credits:</b> 03	<b>Theory Sessions per Week:</b> 03	<b>Teaching Hours:</b> 45 Hours	
Unit	Detailed Syllabus	Teaching Hours	Marks/Weight
<b>Unit-1</b>	<b>Principal Of Object Oriented Programming</b>		
	<ul style="list-style-type: none"><li>- Introduction of OOP, OOP V/s POP</li><li>- Concept of OOP – Object, Class, Inheritance, Encapsulation, Polymorphism, Abstraction ,Message Passing</li><li>- Structure Of C++ Program</li><li>- Tokens in C++</li><li>- Data type, Constant, Variable, Statement &amp; Operators</li></ul>	<b>09</b>	<b>14</b>
<b>Unit-2</b>	<b>Basic C++ Programming</b>		
	<ul style="list-style-type: none"><li>- Function – Member function, Inline function, Friend function</li><li>- Constructor – Types of constructor, characteristics of constructor, constructor overloading.</li><li>- Destructor</li><li>- Input/output statements</li><li>- Declaration &amp; Creation of Class and Object</li></ul>	<b>09</b>	<b>14</b>
<b>Unit-3</b>	<b>Operator overloading and Type conversion</b>		
	<ul style="list-style-type: none"><li>- Basic of operator overloading</li><li>- Types of operator overloading-Unary, Binary</li><li>- Operator overloading using member function &amp; friend function</li><li>- Type conversion</li><li>- Categories of type conversion</li></ul>	<b>09</b>	<b>14</b>
<b>Unit-4</b>	<b>Inheritance</b>		
	<ul style="list-style-type: none"><li>- Basic of inheritance-</li><li>- Types of inheritance- Single level, multiple, multilevel, hierarchical and hybrid</li><li>- Constructor in derived class</li><li>- Concept of Abstract class</li><li>- Nesting of classes</li></ul>	<b>09</b>	<b>14</b>
<b>Unit-5</b>	<b>Polymorphism</b>		
	<ul style="list-style-type: none"><li>- Basic of Polymorphism-Compile time &amp; Runtime polymorphism</li><li>- This pointer</li><li>- Pointers to derived classes</li><li>- Virtual and Pure virtual function</li><li>- Virtual constructor and destructor</li></ul>	<b>09</b>	<b>14</b>
<b>Reference Books</b>			
<ol style="list-style-type: none"><li>1. E-Balaguruswami: Object Oriented Programming with C++ Mc Graw-Hill</li><li>2. Robert Lafore: Object Oriented Programming with C++ Galgotia Publications.</li><li>3. Rajaraman: Object Oriented Programming with C++ New age International</li></ol>			



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<b>B.C.A.</b>		<b>Course:</b> System Analysis And Design	<b>Course No:</b> BCA-CC-304	
<b>Semester:</b> 03		<b>Type of Course :</b> Core Course		
<b>Marking Scheme:</b> External Examination: 70 + Internal Examination: 30 = 100				
<b>Credits:</b> 03		<b>Theory Sessions per Week:</b> 03	<b>Teaching Hours:</b> 45 Hours	
Unit	Detailed Syllabus	Teaching Hours	Marks/Weight	
<b>Unit 1</b>	<b>System Concept</b>	<b>9</b>	<b>14</b>	
	<ul style="list-style-type: none"><li>- Introduction to system</li><li>- Characteristics and elements of system</li><li>- Types of system</li><li>- System analysis</li><li>- System analyst &amp; its role.</li><li>- CBIS, Information system and categories of information system.</li><li>- System users.</li></ul>			
<b>Unit 2</b>	<b>System Development Strategies</b>	<b>9</b>	<b>14</b>	
	<ul style="list-style-type: none"><li>- Introduction to SDLC</li><li>- Phases of SDLC</li><li>- Application of SDLC Method</li><li>- Limitation of SDLC Method</li><li>- Introduction to SSADM</li></ul>			
<b>Unit 3</b>	<b>Structured System Analysis and Design Method</b>	<b>9</b>	<b>14</b>	
	<ul style="list-style-type: none"><li>- Need of SSADM</li><li>- System survey</li><li>- Structured analysis</li><li>- Structured design</li><li>- Advantages of SSADM</li><li>- System Prototype Method (SPM)</li></ul>			
<b>Unit 4</b>	<b>Input/ Output Design &amp; Fact Finding Techniques</b>	<b>9</b>	<b>14</b>	
	<ul style="list-style-type: none"><li>- Input – data capture objectives.</li><li>- Data verification &amp; Validation</li><li>- Interactive screen</li><li>- Output - Design of Output &amp; its Objectives</li><li>- FFT – Interview, Questionnaire, Record Inspection, Observations.</li></ul>			
<b>Unit 5</b>	<b>Analysis &amp; Design Tools</b>	<b>9</b>	<b>14</b>	
	<ul style="list-style-type: none"><li>- DFD, Symbols uses in DFD, Physical &amp; Logical Design</li><li>- Decision table &amp; tree</li><li>- Data Dictionary</li><li>- HIPO chart, Warnier/Orr diagrams</li><li>- Structured English</li></ul>			
<b>Reference Book:</b>				
<ol style="list-style-type: none"><li>1. James A Senn: Analysis and Design of Information Systems, McGraw Hill Intl. Std. Edn</li><li>2. S. Parthasarthy &amp; B. W. Khalkar : System Analysis &amp; Design 1st Edition, Master Ed.Cons.</li><li>3. Yourdon E. and Constantine L. L : Structured Analysis &amp; Design Yourdon press NY</li></ol>				



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<b>B.C.A.</b>	<b>Course:</b> Practical	<b>Course No:</b> BCA-CC-305
<b>Semester:</b> 03	<b>Type of Course:</b> Core Course	
<b>Marking Scheme:</b> External Examination: 100 + Internal Examination: 00 = 100 Marks		
<b>Credits:</b> 12	<b>Practical Sessions per Week:</b> 12	<b>Teaching Hours:</b> 180 Hours

<b>Unit</b>	<b>Detailed Syllabus</b>	<b>Teaching Hours</b>	<b>Marks/Weight</b>
Unit-1	Practical Based on 302	90	50
Unit-2	Practical Based on 303	90	50