School: Computer Sciences and Engineering	Programme: BCA IILP			
Course Code: TXCA201	Year: First Year			Semester - II
Course: Object oriented Programming Using C++	L	T	P	C
	3	1	--	4
Theory: 3 Hrs/Week	Max. University Theory Examination: 50 Marks			
Max. Time for Theory Exam.: 3 Hrs	Continuous Internal Assessment: 50 Marks			

Objectives	
1	To understand how C++ improves C with object-oriented features.
2	To learn the syntax and semantics of the C++ programming language.
3	To understand the concept of data abstraction and encapsulation and to learn how to overload functions and operators in C++.
4	To learn how containment and inheritance promote code reuse in C++ and how inheritance and virtual functions implement dynamic binding with polymorphism.
5	To design and implement generic classes with C++ templates and to learn how to use exception handling in C++ programs.

Course Outcomes	
On successful completion of the course students will be able to:	
1	Understand and Apply Object oriented features and C++ concepts
2	Apply the concept of polymorphism and inheritance
3	Implement exception handling and templates.
4	Develop applications using Console I/O and File I/O.

Unit Number	Details	Hours
1	**Object Oriented Methodology**: Elements of Object Oriented programming, Objects, Classes, OOPs features. **Classes & Objects:** Specifying a Class, Creating Objects, Accessing Class members, Defining member function, Outside Member Functions as inline, Accessing Member Functions within the class, Static data member, Access Specifiers: Private, Protected and Public Members.	10
2	**Function, Constructors & Destructors:** Introduction to functions, Parameters passing to functions, function overloading. Introduction to Constructor, Parameterized Constructors, Constructor Overloading, Constructors with Default Arguments, Copy Constructor, Destructor, Order of Construction and Destruction, Static data members with	8

	Constructor and Destructors.	
3	**Operator Overloading:** Definition, Overloadable Operators, Unary Operator Overloading, Unary & Binary overloading, Rules for Operators Overloading. **Inheritance:** Defining, Abstract classes, Single, Multilevel, Multiple, Hierarchical, Hybrid Inheritance, Constructor and Destructor in Derived Classes.	10
4	**Polymorphism:** Definition, Application and demonstration of Data Abstraction, Encapsulation and Polymorphism. Early Binding, Polymorphism with pointers, Virtual Functions, Late binding, pure virtual functions, abstract classes	10
5	**Exception Handling:** Exception Handling Model, List of Exceptions, Handling Uncaught Exceptions, Fault Tolerant Design Techniques, Memory Allocation Failure Exception, Rules for Handling Exception Successfully.	7
	Total	**45**

Resources	
Recommended Books	1. Object Oriented Programming with C++ by E. Balagurusamy, McGraw Hill 2. Mastering C++ by K R Venugopal Tata McGraw-Hill , New Delhi. 3. Herbert Schild, "Complete Reference of C++", McGraw Hill
Reference Books	1. The C++ Programming Language –Bjarne Stroustrup 2. Programming with C++ - Ravichandran 3. Programming with C++ - Robert Lafore

School: Computer Sciences and Engineering	Programme: BCA IILP			
Year : First Year	Semester – II			
Course: Digital Electronics	Course Code: TXCA202			
	L	T	P	C
	3	1	2	5
Theory: 3 Hrs/Week	Max. University Theory Examination:50 Marks			
Max. Time for Theory Exam.: 3 Hrs	Continuous Internal Assessment: 50 Marks			

Objectives	
1	To study and understand the Number System and their conversion.
2	To learn Data Representation and Binary Arithmetic.
3	To study and analyze various logic gates and their properties.
4	To Study and apply Boolean Algebra for logical expressions.
5	To study and demonstrate K-Map.

Course Outcomes	
On successful completion of the course students will be able to:	
1	Understand different Number systems, Codes, Logic Gates, Boolean laws &theorems.
2	Design & implement different types of combinational logic circuits using Logic gates.
3	Design & implement different types of sequential logic circuits using Flip Flops
4	Design & implement different types of Counters, a, c, k Registers, and Programmable Logic Devices

Unit Number	Details	Hours
1	**Number System**: Binary, Octal, Decimal and Hexadecimal number system and their inter conversion. **Binary Codes:** BCD, Excess3 , Parity, Gray, ASCII, EBCDIC codes and their advantages and disadvantages.	10
2	**Data Representation:** Positive, negative, maximum and minimum number representation (related to 8 bit number), real number representation, underflow, overflow, range and accuracy. **Binary Arithmetic:** Binary addition, binary subtraction using 1's and 2's compliment.	10
3	**Logic gates:** Truth table, properties and symbolic representation of NOT, AND, OR, NOR, NAND, EXOR, EXNOR gates. NOR and NAND gates as a universal gates.	8
4	**Boolean Algebra:** Laws and Identities of Boolean algebra, DeMorgan's Theorem , use of Boolean Algebra for simplification of	8

	logic expression,	
5	**K-Map:** K-Map for 2, 3, 4 variables, simplification of SOP and POS logic expression using K-Map.	9
	Total	**45**

Resources	
Recommended Books	1. Digital Electronics by Gothman(PHI) 2. Digital and analogue technique by Navaneeth, Kale and Gokhale 3. Modern Digital Electronics by R. P. Jain
Reference Books	1. Digital Design, M.M. Mano, Pearson Education Asia, 1979

School: Computer Sciences and Engineering	Programme: BCA IILP			
Course Code: TXCA203	Year: First Year Semester – II			
Course: Data Structures using C++	L	T	P	C
	3	--	2	4
Theory: 3 Hrs/Week	Max. University Theory Examination: 50 Marks			
Max. Time for Theory Exam: 3 Hrs	Continuous Internal Assessment: 50 Marks			

Objectives	
1	To understand different methods of organizing large amounts of data.
2	To efficiently implement linear data structures.
3	To comprehend the concept of linked list and its different types
4	To understand the data structures like stack and queues for storing data.
5	To figure the difference between the concept of trees and graphs when used as data structures.

Outcomes	
	On completion of this course, student should be able to:
1	**Design** and analyze the time and space efficiency of the data structure.
2	**Identity** the appropriate data structure for given problem.
3	**Understand** the applications of data structures.
4	**Choose** the appropriate data structure and algorithm design method for a specified application.
5	**Understand** which algorithm or data structure to use in different scenarios.
6	**Understand** and apply fundamental algorithmic problems including Tree traversals,Graph traversals.
7	**Compare** different implementations of data structures and to recognize the advantages and disadvantages of them.

Unit Number	Details	Hours
1	**Basic Concept and Introduction to Data Structure:** Pointers and dynamic memory allocation: Algorithm-Definition and characteristics, Algorithm Analysis; Space Complexity; Time Complexity; Asymptotic Notation; Introduction to Data structure: Types of Data structure; Abstract Data Types (ADT);	**10**
2	**Linear Data Structure:** Introduction to Arrays and Structure: Types of array and Representation of array , **Searching and Sorting Techniques** :Linear Search, Binary Search Bubble Sort, Insertion Sort, Selection Sort, Merge Sort	**8**

3	**Linked List:** Introduction, ADT, Static & Dynamic Representation , Types of linked List: Singly Linked list(All type of operation) , Doubly Linked list (Create , Display), Circularly Singly Linked list (Create, Display),Application of Linked List	**6**
4	**Stack and Queue:** **Stack:** Introduction stack, stack as ADT, array representation of stack, linked representation of stack, Static and Dynamic Representation, Primitive Operations on stack, Application of Stack, Evaluation of postfix and prefix expression, Conversion of expressions- Infix to prefix & Infix to postfix **Queue** : Introduction queue, queue as ADT, array representation of queue, linked representation of queue, Static and Dynamic Representation, Primitive Operations on Queue, Application of Queue, circular queue	**12**
5	**Trees and Graphs:** **Trees:** Introduction & Definitions, Terminology , Static and Dynamic Representation, Types of tree, Tree Traversal Inorder , Preorder, Postorder (Recursive & Iterative) **Graphs**: Basic Concepts and Terminologies, Representation, Adjacency Matrix, List, In degree , out degree of graph, Prim's and Kruskal's algorithms, Dijikstra's shortest path algorithm	**9**
	Total	**45**

Resources	
Recommended Books	1. "Fundamental of data structure", EillsHorowita and satarjshani2 2. "Data structures Using C and C++", Rajesh K. Shukla ,wiley.India 3. "Data structures Files and Algorithms", Abhay KAbhyankar. 1. "Data structures and algorithms", Alfraid V Aho, John Ehopcroft, Jeffery DUllman.
Reference Books	"Data structures Using C++",Balaguruswamy OOP with C++ Pearson Education,India.

School: Computer Sciences and Engineering	Programme: BCA IILP			
Course Code: TXCA203	Year : First Year Semester - II			
Course: Lab Course based on DS Using C++	L	T	P	C
	--	--	2	1
Practical: UG - 4 Hrs/Batch (20 Students)	Practical Examination: 25 Marks			
	Formative CIA/Term Work :25 Marks			

Objectives	
1	To demonstrate various sorting algorithms using C++.
2	To demonstrate the use of various data structures.

Set of Suggested assignment list is provided in 3 groups – A, B, C.
Instructor is suggested to design assignment list by selecting/ designing at least 12 suitable assignments as a study assignments.
1.At least 6 assignments from group A.
2.At least 4 assignments from group B.
3.At least 2 assignments from group C.

Sr. No.	Description
	Group A: Programs on Data Structure (Any SIX Assignments)
1	WAP to implement linear search to find an item in the list.
2	WAP to implement binary search to find an element in an ordered list.
3	WAP to sort given elements using a bubble sort algorithm
4	WAP to sort given elements using a insertion sort algorithm
5	WAP to sort given elements using a merge sort algorithm
6	WAP to sort given elements using a quick sort algorithm
7	WAP to implement various set operations on a given set of elements
	Group B: (Any Four Assignments)
8	WAP to implement a stack and perform various operations like push, pop, display
9	WAP to implement a queue and perform various operations on the queue
10	WAP to implement a linked list and perform various operations on the linked list

11	WAP to Convert a Decimal Number to Binary Number using Stacks.
12	WAP of STACK implementation using Linked List.
	Group C: (Any Two Assignments)
13	WAP to construct a binary tree, and perform different traversal operations on the same.
14	Write recursive programs to implement factorial, Fibonacci series or Tower of Hanoi.
15	Implement Prim's and Kruskal Algorithm.

Term Work:
Term Work assessment shall be conducted for the Project, Tutorials and Seminar. Term work is continuous assessment based on work done, submission of work in the form of report/journal, timely completion, attendance, and understanding. It should be assessed by subject teacher of the institute. At the end of the semester, the final grade for a Term Work shall be assigned based on the performance of the student and is to be submitted to the University.

Notes:	
1	The experiments from the regular practical syllabus will be performed (15 Marks).
2	The regular attendance of students during the syllabus practical course will be monitored and marks will be given accordingly (5 Marks).
3	Good Laboratory Practices (5 Marks)

Practical/Oral/Presentation:
Practical shall be conducted and assessed jointly by internal and external examiners. The performance in the Practical examination shall be assessed by at least a pair of examiners appointed as examiners by the University. The examiners will prepare the mark/grade sheet in the format as specified by the University, authenticate and seal it. Sealed envelope shall be submitted to the head of the department or authorized person.

School: Computer Sciences & Engineering	Programme: BCA IILP			
Course Code: TXCA202	Year: First Year		Semester - II	
Course: Lab Course based on Digital Electronics	L	T	P	C
	--	--	2	1
Practical: UG - 4 Hrs/Batch (20 Students)	Practical Examination: 50 Marks			
	Formative CIA/Term Work: 50 Marks			

Objectives	
	On completion of this course, student should be able to:
1	Understand various digital devices and circuits.
2	Understand the basics of Microprocessor.
3	Develop and execute assembly language programs for microprocessor.

Sr. No.	Description
	Group A: Python Programming (Any SIX Assignments)
1	Verify the truth table of logic gates
2	Design and verify the truth table of half and full adder.
3	Verify the working of 4 bit left shift register
4	Develop and execute an ALP for basic arithmetic operations on 16 bit Nos.
5	Develop and execute an ALP for 8086 to arrange five 16 bit numbers in ascending / descending order.
6	Check the truth table of basic gates using universal gates.
7	Verify De-Morgan's theorem using digital ICs.
	Group B: (Any Three Assignments)

8	Implement combinational circuit using Multiplexer.
9	Construct S-R, J-K, D and T flip flops using gates.
10	Develop and execute an ALP for 8086 to perform logical operations on 16 bit Nos.
11	Develop and execute an ALP to add sum of series of 16 bit numbers.
12	Develop and execute an ALP to add two 8 bit BCD numbers.
	Group C: (Any One Assignments)
13	Design a 4 bit up counter using flip-flops.
14	Design a MOD-10 counter using flip-flops.

Term Work:
Term Work assessment shall be conducted for the Project, Tutorials and Seminar. Term work is continuous assessment based on work done, submission of work in the form of report/journal, timely completion, attendance, and understanding. It should be assessed by subject teacher of the institute. At the end of the semester, the final grade for a Term Work shall be assigned based on the performance of the student and is to be submitted to the University.

Notes:	
1	The experiments from the regular practical syllabus will be performed (15 Marks).
2	The regular attendance of students during the syllabus practical course will be monitored and marks will be given accordingly (5 Marks).
3	Good Laboratory Practices (5 Marks)

Practical/Oral/Presentation:
Practical shall be conducted and assessed jointly by internal and external examiners. The performance in the Practical examination shall be assessed by at least a pair of examiners appointed as examiners by the University. The examiners will prepare the mark/grade sheet in the format as specified by the University, authenticate and seal it. Sealed envelope shall be submitted to the head of the department or authorized person.

Notes	
1	One experiment from the regular practical syllabus will be conducted. (Total 15 Marks).
2	Complete laboratory journal (05 Marks).
3	Viva-voce (05 Marks).

School: Computer Sciences and Engineering	**Programme: BCA IILP**			
Course Code: TXCA205	**Year: First Year**			**Semester - II**
Course: Internet Technology	**L**	**T**	**P**	**C**
	3	**1**	**--**	**4**
Theory: 3 Hrs/Week	**Max. University Theory Examination: 50 Marks**			
Max. Time for Theory Exam.: 3 Hrs	**Continuous Internal Assessment: 50 Marks**			

Objectives	
1	To study the evolution of Internet, Email and various protocols.
2	To understand the HTML concept and apply it to design simple web pages
3	To learn Advanced HTML and its features along with its properties
4	To analyze PHP concept along with its data types and control structures
5	To study and implement HTML form with PHP and File handling

Course Outcomes	
On successful completion of the course students will be able to:	
1	Understand the basics of internet.
2	Be able to create web pages in HTML and make web applications
3	Be able to comprehend advanced concepts of HTML.
4	To implement HTML and PHP and design web applications

Unit Number	**Details**	**Hours**
1	**Internet :** History and evolution of Internet .Internet &intranet ,Basic concept of www , HTTP, FTP, URL, domain name, IP address, web browser, web server, web page, web site, Portals, email, Usenet, telnet,. Searching, downloading, uploading, files on internet ,Search Engines, Internet Protocol :TCP/IP, dialup access, direct access, three levels of Internet connectivity. ISPs, Introduction to DNS, Web Browser Architecture	10
2	**Introduction to HTML** – Introduction ,History, Structure, Elements of an HTML Document: Text Elements, Tag Elements., Paragraphs, Image tags, HTML Table tags, Lists: Numbered and non-numbered list, Hyperlinks, Buttons, Formatting: Text fonts and styles, Background color, Marquee., Forms related tags (action, method,	9

	name, input, submit etc)	
3	**Advance HTML**: List - Creating Table - Linking document Frames - Graphics to HTML Doc - Style sheet - Style sheet basic - Add style to document - Creating Style sheet rules - Style sheet properties - Font - Text - List - Color and background color - Box - Display properties.	8
4	**JavaScript:** Introduction to JavaScript, Basic Syntax. Control Structures. Writing Functions. Working with Arrays. The Document Object Model. Events Handling. Using Browser Objects. Object Oriented in JavaScript.	11
5	**Introduction to AJAX:** AJAX, RIA & WEB 2.0. The XMLHTTPRequest Object. Using AJAX in Web Applications.	7
	Total	**45**

Resources	
Recommended Books	1. Teach Your Self Internet In 24 Hours : Techmedia. 2. HTML Black Book: Steven Holzer 3. Ivan Bay Ross- Web Enable Commercial Application Using HTML, DHTML, BPB Publication 4. Internet Programming with VBScript and Java Script. Kathhleen Kalata, (Thomson Publication) 5. Thomos Pawell, "JavaScript Complete Reference", McGraw Hill 6. Web Technologies HTML, Javascript, PHP, Java, JSP,ASP.NET, XML and AJAX Black Book, Dreamtech Press
Reference Books	1. Internet Complete: BPB Publication. 2. Adam Trachtenberg and David Sklar,"PHP Cookbook", O'Reilly Media

School: Computer Sciences & Engineering	Programme: BCA IILP			
Course Code: TXCA206	Year : First Year Semester - II			
Course: Computer Fundamental	L	T	P	C
	3	--	--	3
Theory: 3Hrs/Week	Max. University Theory Examination: 50 Marks			
Max. Time for Theory Exam.: 3 Hrs	Continuous Internal Assessment:50 Marks			

Course Objectives	
1	To define &understand the basics of computer system.
2	To determine the meaning &functions of computer hardware components
3	To understand the concept and the need of primary and secondary memory
4	To study various input and output units and their purposes

Course Outcomes	
On successful completion of the course students will be able to:	
1	Understand the meaning and basic components of a computer system
2	Explain and identify different computing machines during the evolution of computer system and their generations.
3	Identify and discuss the functional units of a computer system
4	Identify the various input and output units and explain their purposes

Unit Number	Details	Hours
1	**Introduction to Computers**, Need for Computer Literacy. Computer: The Definition, Basic Anatomy of Computers, Characteristics of Computers, Evolution of Computers, The Computer Generations Function of a computer , Application of computer, Solution of different problem using Computer	9
2	**Basic Computer Organization**, Introduction, Components of a Digital Computer. The Input Unit, The Output Unit, The Central Processing Unit, The Control Unit, The Main Memory Unit, Storage Unit. Components of Computer ,CPU, Memory Structure, ALU	9
3	**Memory &Processor:** Introduction, the Central Processing Unit, Registers, Instruction Sets, Program Interrupts, Different Types of Memory, Architecture of Memory/ Processor Speed Memory, Memory Unit.	8
4	**Secondary Storage Devices**: Introductions, Need of Secondary Storage Devices, Characteristics of Secondary Storage Devices, Types of Storage Devices .Magnetic Tape Systems, Magnetic Disk, Types of Disks, Optical Disk, Mass Storage Devices, Storage Hierarchy.	9
	Input and Output Devices Introductions, Input Devices, Data	

5	Scanning Devices, Digitizer, Electronic Card Reader, Voice Recognition Devices. Vision Input System, Output Devices, Voice Response System, Screen Image Projector. **Introduction to Computer Networks:** Computer communication, communication components, computer network, Network Topologies, Protocols, Introduction to internet- IP address, MAC Address.	**10**
	Total	**45**

Resources	
Recommended Books	1. Computer Fundamental – V. Rajaraman 2. Introduction to Computer Fundamentals – P K. Sinha (BPB)
Reference Books	1. Intel Microprocessor Hand book (or PDF File from www.microsoft.com) 2. Computer Organization by Tannenbaum