Gujarat University

Bachelor of Computer Applications

Semester III (CBCS)

Syllabus

(Effective from June 2018)

GUJARAT UNIVERSITY
BCA SEMESTER III SYLLABUS

COURSE TITLE	**Computer Organization**
COURSE CODE	**CC-201**
COURSE CREDIT	**3**
Session Per Week	**4**
Total Teaching Hours	**40 HOURS**

AIM

To study and understand the basic organization of computers and the working of each component.

LEARNING OUTCOMES

On the completion of the course students will:
1. Understand the working of basic computer components and CPU operation.
2. Data Representation in computers.
3. Understand the concepts related to computer memory.

DETAIL SYLLABUS

UNIT	TOPIC / SUB TOPIC	TEACHING HOURS
1	**Logic Circuits and Components of Digital Computers**	**10**
	Digital Logic Circuit • Digital Computers • Logic Gates • Boolean Algebra	**2**
	• Combinational Circuits o Half-Adder o Full-Adder	**2**
	• Flip-Flops o SR Flip-Flop o D Flip-Flop o JK Flip-Flop o T Flip-Flop	**2**
	Digital Components • Integrated Circuits • Decoders o NAND Gate Decoder o Encoders	**2**
	• Multiplexers • Registers • Shift Registers • Binary Counters • Memory Unit o Random-Access Memory o Read-Only Memory o Types of ROMs	**2**

2	**Representation of Data and Register Transfer with Microoperations**	**10**
	Data Representation • Data Types o Number System o Octal and Hexadecimal Numbers o Decimal Representation o Alphanumeric Representation • Complements o (r-1)'s Complement o (r)'s Complement • Fixed-Point Representation o Integer Representation o Arithmetic Addition o Arithmetic Subtraction o Overflow o Decimal Fixed-Point Representation • Floating-Point Representation • Error Detection Codes	**1** **2**
	Register Transfer and Micro-operations • Register Transfer Language • Register Transfer • Bus and Memory Transfers o Three-State Bus Buffers o Memory Transfer • Arithmetic Micro-operations o Binary Adder o Binary Adder-Subtractor o Binary Incrementer o Arithmetic Circuit • Logic Micro-operations o List of Logic Micro-operations o Hardware Implementation • Shift Micro-operations • Arithmetic Logic Shift Unit	**1** **3** **3**
3	**Design and Organization of Basic Computer, CPU**	**10**
	Basic Computer Organization and Design • Instruction Codes o Stored Program Organization o Indirect Address • Computer Registers o Common Bus System • Computer Instructions o Instruction Set Completeness • Timing and Control • Instruction Cycle o Fetch and Decode o Determine the Type of Instruction o Register-Reference Instructions • Memory-Reference Instructions • Input-Output and Interrupt • Complete Computer Description • Design of Basic Computer • Design of Accumulator Logic	**2** **2**

	Central Processing Unit • Introduction • General Register Organization • Stack Organization • Instruction Formats • Addressing Modes • Data Transfer and Manipulation • Program Control	**3** **3**
4	**Organization of Input-Output and Memory**	**10**
	Input-Output Organization • Peripheral Devices • Input-Output Interface • Asynchronous Data Transfer o Handshaking • Modes of Transfer • Priority Interrupt • Direct Memory Access	**2** **3**
	Memory Organization • Memory Hierarchy • Main Memory • Auxiliary Memory • Associative Memory • Cache Memory • Virtual Memory	**2** **3**

TEXT BOOK/S:

Text Book:
Computer System Architecture (3rd Edition)
By: M. Morris Mano
Publisher: Pearson

REFERENCE BOOKS:

1. Computer Architecture and Organization (2nd Edition), By: B. Govindrajalu, Publisher: TMH

WEB RESOURCES:

https://www.tutorialspoint.com/computer_logical_organization/index.htm
https://en.wikipedia.org/wiki/Computer_architecture
http://nptel.ac.in/courses/106103068/#
http://www.srmuniv.ac.in/downloads/computer_architecture.pdf
https://imlearner.files.wordpress.com/2010/08/computer-system-architecture-3rd-ed-morris-mano-p98.pdf
http://www.a-zshiksha.com/forum/viewtopic.php?f=133&t=61511
https://docs.google.com/file/d/0B0DfyDcYZ0AbeFlhdmo3cy1udVk/edit
https://docs.google.com/uc?id=0B0DfyDcYZ0AbN2tzZEhRcEF1a1k&export=download
https://robot.bolink.org/ebooks/Computer%20System%20Architecture%203e%20By%20M%20Morris%20Mano.pdf
https://books.google.co.in/books/about/Computer_Architecture_and_Organization.html?id=YT74AkSrj4sC
http://www.freebookcentre.net/CompuScience/Free-Computer-Architecture-Books-Download.html
http://freecomputerbooks.com/compscCategory.html
http://www.freetechbooks.com/computer-organization-and-architecture-f56.html

GUJARAT UNIVERSITY
BCA III SYLLABUS

COURSE TITLE	**Data Structures**
COURSE CODE	**CC-202**
COURSE CREDIT	**3**
Session Per Week	**4**
Total Teaching Hours	**40 HOURS**

AIM

This course introduces students to get the detail knowledge of Basic data structures, representations, building and use of those data structures in different applications in real world.

LEARNING OUTCOMES

Students would be able-
1) To understand the concept, role and importance of Data.
2) To recognize the use of Data Structure for real applications.
3) To identify the key differences between various data structures.
4) To comprehend the type of data structure to apply according to the scenery of applications.
5) To be aware of the real building of the data structure using various programming languages.
6) To implement the various operations of data structures by using algorithms.
7) To deal with every tiny elements of the Data Structures.

DETAIL SYLLABUS

UNIT	TOPIC / SUB TOPIC	TEACHING HOURS
1	**Introduction to Data Structures, Arrays & Linked List** • **Introduction** o Data o Data Types ▪ Abstract Data Types (Primitive) ▪ User-Defined Data Types (Non-Primitive) o Data Structures: o Definition o Classification of Data Structures and details of each classifications	**10** **2**
	• **Array** o Definition o Mapping o Sparce Matrix	**1**

1	• **Linked list** o Comparison of Array and Linked List o Types of Linked Lists o Representation of Linked Lists o Operations on Doubly Linked Lists (Algorithm and Explanation) ▪ Creation ▪ Traversal ▪ Insertion i. At Front ii. In Between (After and Before) iii. At End ▪ Deletion i. From Beginning ii. From Between iii. From End	**2**
	• Searching: o Introduction to Searching o Searching Techniques: ▪ Sequential Search ▪ Binary Search	**2**
	• Sorting: o Introduction to Sorting o Sorting Techniques: ▪ Bubble sort ▪ Selection sort ▪ Insertion sort ▪ Quick sort ▪ Merge sort	**3**
2	**Stack & Queues**	**10**
	• **Stack:** o Introduction (Idea of the Stack) o Operations of the Stack (Algorithm and Explanation) o Implementation of the Stack (Using Array and linked list) o Applications of the Stack: ▪ Definition: Reverse and Polish ▪ Conversion: Infix to Postfix using manually and stack for parenthesis and Non-parenthesis (with Algorithm) ▪ Recursion(Definition)	**5**
	• **Queue:** o Introduction (Idea of the Queue) o Types of Queue o Operations of Simple and Circular Queue (Algorithm and Explanation) o Implementation of the Queue (Using Array and Linked list)	**5**

	Tree	**10**
3	• Introduction • Terminology • **Binary Tree:** o Definition o Representation of Binary Tree o **Operation on Binary Tree** ▪ Creation ▪ Insertion ▪ Deletion ▪ Traversal (Pre-Order, In-Order and Post- Order) Ecluding general binary tree ▪ Conversion from (Pre, In or Post) into Binary Tree	**5**
	• **Types of Binary Tree** o Full Binary Tree o Complete Binary Tree o Binary Search Tree o Expression Tree o Threaded Binary Tree o Heap Tree o Height Balanced Tree (AVL Tree) o B-Tree	**5**
4	**Graph**	**10**
	• Introduction • Basic Terminology • **Representation of Graph** o Adjacency Matrix (Array) o Adjacency Linked • **Traversal of Graph** o Breadth First Traversal (Algorithm and Tracing) o Depth First Traversal (Algorithm and Tracing)	**6**
	• **Application of Graph** o Spanning Tree ▪ Mnimum Spanning Tree (BFS and DFS) ▪ Prim's Algorithm ▪ Kruskal's Algorithm o Shortest Path Algorithm o Dijkstra's Algorithm	**4**

TEXT BOOK:

Data and File Structures using C Publisher: Oxford
By Reema Thareja

- **Chapter-4 (4.1, 4.2, 4.3) – Introduction to Data Structures**
- **Chapter-5 (5.1, 5.2, 5.3, 5.6.5, 5.16) – Array and Searching**
- **Chapter-8 (8.2, 8.7) – Linked List**
- **Chapter-9 (9.1, 9.3, 9.4, 9.5, 9.7, 9.8, 9.11, 9.12, 9.13, 9.14, 9.16[Only Definition],9.17[Definition and 9.17.1]) – Stack & Queues**
- **Chapter-10 (10.1, 10.2, 10.4[excluding 10.4.4]) - Tree**
- **Chapter-11 (11.1, 11.2.2, 11.2.3, 11.3, 11.4 [Definition and 11.4.2], 11.6[Definition and 11.6.2]) - Tree**
- **Chapter-12 (12.1[Definition and 12.1.1, 12.1.2]) - Tree**
- **Chapter-13 (13.1, 13.4, 13.5, 13.7[excluding 13.7.5]) - Graph**
- **Chapter-14 (14.1, 14.2, 14.3, 14.4, 14.5, 14.6) - Sorting**

REFERENCE BOOKS:

1. Data Structures and Algorithms in C++ Publisher: Dreamtech
By B. M. Harvani
2. Magnifying Data Structures Publisher: PHI
By: Arpita Gopal
3. Data Structures using C & C ++ Publisher: Wiley-India
By : Rajesh K. Shukla
4. Introduction to Data Structures in C Publisher: Pearson Education
By: Ashok N. Kamthane
5. Data Structures Using C Publisher: Pearson Education By : A. K Sharma

REQUIRED SOFTWARE/S

Turbo c

GUJARAT UNIVERSITY
BCA III SYLLABUS

COURSE TITLE	**Object Oriented Concepts and Programming**
COURSE CODE	**CC-203**
COURSE CREDIT	**3**
Session Per Week	**4**
Total Teaching Hours	**40 HOURS**

AIM

1.) To get in-depth knowledge of Object Oriented Programming language.
2.) To obtain knowledge of programming for real life applications.

LEARNING OUTCOMES

1. Understand the features of C++ supporting object oriented programming
2. Understand the relative merits of C++ as an object oriented programming language
3. Understand how to produce object-oriented software using C++
4. Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism.
5. Understand advanced features of C++ specifically stream I/O, templates and operator overloading

DETAIL SYLLABUS

UNIT	TOPIC / SUB TOPIC	TEACHING HOURS
1	**OOPS Introduction**	**10**
	*** Overview of Object Oriented Programming** o Introduction to Object Oriented Programming o Procedure Oriented and Object Oriented o Difference Between C and C++ o C++ Output/ Input o Keywords in C++ o New style of header file specification o Comments in C++ o Variables in C++ o Reference Variables in C++ o The bool Data type o Importance of function prototyping in C++ o Function Overloading o Default Arguments o Inline Function o Scope Resolution Operator	**6**

	Classes And Object o Structures in C o Structure in C++ o Access Specifier o Classes o Objects in C++ o Characteristics of Access Specifier o Function outside a class o Initialization of variable in C++ o Arrow Operator o 'this' pointer	**4**
2	**More on++Classes and Object, Dynamic Memory Management, Constructor & Destructor**	**10**
	* **More on Classes and Objects** o Member Functions and Data Members o Friend Functions o Friend Class o Array of Class Object o Passing Class Objects to Function o Returning Objects from Functions o Nested Classes o Namespaces	**5**
	* **Dynamic Memory Management** o Introduction o Dynamic Memory Allocation Using "new" o Dynamic Memory Deallocation	**2**
	* **Constructor and Destructor** o Constructor o Characteristics of Constructor o Types of Constructor o Destructor o Characteristics of Destructor	**3**
	Inheritance and Polymorphism	**10**
	* Inheritance o Introduction o Advantages of Inheritance o 'Protected' Access specifier o Inheritance using different access specifier o Initialization of Base class members through derived class object o Different forms of Inheritance o Function Overriding	**5**

3	* **Virtual Functions and Inheritance** o Introduction o Pointers to derived class o Rules for virtual function o Internals of Virtual Functions o Pure virtual function o Virtual Base class o Virtual destructor o Abstract class o Limitations of virtual Function o Early binding v /s Late binding	**5**
4	**Operator Overloading, Working with Files and Templates**	**10**
	* **Operator Overloading** o Introduction o Operators that can be overloaded o Overloading Unary Operator using member Functions (-,++ and --) o Overloading Unary Operator using friend Functions (+,-,++ and --) o Overloading Binary Operator using member Functions (+,-,*,/,>,<,==,!=,>= and <=) o Overloading Binary Operator using friend Functions (+,-,*,and /) o Why to Overload Operators using friend function? o Rules for Operator Overloading o Type Conversions * basic type to class type * class type to basic type * class type to another class type o Excluding Assignment operators (=,+=,*=,/=,- =,%=,&=,|=,^=), Bit-wise Operator, Dereferencing, New, Delete, Subscript, Function call, Logical and >>=,<<=	**5**
	* **Working with Input, Output and Files** o Introduction o Stream Class Model of C++ (istream,ostream,ifstream,ofstream,iostream) o Text Files o Test mode input using 'extraction'(>>) operator, 'get()' function and 'getline()' function o Text mode output using 'insertion' (<<) operator and 'put()' function	**2**
	* **Templates** o Introduction o Function Templates o Function Templates with multiple parameters o Overloading Function Template o Class Template o Class Template with multiple parameters o Nested Class Templates o Advantages of using Templates	**3**
TEXT BOOK/S:		

1. Object Oriented Programming with C++
Publication: Pearson
By Subhash KU

REFERENCE BOOKS:

1. **Object-Oriented Programming with C++ (Second Edition)**
Publication: PHI
By Poornachandra Sarang
2. **Object Oriented Programming using C++**
Publication: Cengage Learning
By Joyce Farrell
3. **Object Oriented Programming In C++**
Publication: Wiley India Edition
By Rajesh K. Shukla

WEB RESOURCES:

REQUIRED SOFTWARE/S

Turbo C

GUJARAT UNIVERSITY
BCA SEMESTER III SYLLABUS

COURSE TITLE	**Fundamentals of Operating System**
COURSE CODE	**CC-204**
COURSE CREDIT	**3**
Session Per Week	**4**
Total Teaching Hours	**40 HOURS**

AIM

To understand the fundamentals of processes, scheduling concepts, memory management, I/O and file systems in a typical operating system.

LEARNING OUTCOMES

On the completion of the course students will:
1. Know the components of an operating system
2. Understand the basics of process management and memory management.
3. Know the concepts of I/O and file systems
4. Provide information about the functions and roles of each of the components of the operating system.

DETAIL SYLLABUS

UNIT	TOPIC / SUB TOPIC	TEACHING HOURS
1	Introduction to Operating System &Processor Management	**10**
	• Introduction to Operating System o What is Operating System? o Operating system software o Types of Operating System	**2**
	• Memory Management: Early System o Single User Contiguous Scheme o Fixed Partitions o Dynamic Partitions o Allocation and deallocation methods o Relocatable Dynamic Partitions	**3**
	• Memory Management: Virtual Memory o Paged Memory Allocation o Demand Paging o Page Replacement Algorithms ▪ First In First Out ▪ Least Recently Used o Segmented Memory allocation o Segmented/Demand Paged Memory allocation o Virtual Memory	**5**

2	**Processor Management** • Job Scheduler, Process Scheduler, • Job and Process Status • Process Control Block • Process Scheduling Policies • Process Scheduling Algorithms: (Examples to be done with or without Arrival time) • First Come First Serve, Shortest Job Next, Priority Scheduling, Shortest Remaining Time, Round Robin	**10**
3	**Deadlock and Process Synchronization** • Deadlock o Seven cases for deadlock o Conditions for Deadlock o Strategies for handling Deadlocks o Starvation(Dining Philosophers Problem) • Process Synchronization o What is parallel Processing? o Typical Multi processing configurations o Process Synchronization Software-test and set, Wait & Signal o Semaphores o Process Cooperation- Producers and consumers	**10** **5** **5**
4	**Device Management & File Management** • Device Management o Types of System Devices o Communication among devices o Management of I/O requests o Device Handler Seek Strategies ▪ FCFS ▪ SSTF ▪ Elevator(Look) • File Management o The File Manager o Physicals to rage allocation o Data Compression o Access Control Verification module	**10** **6** **4**

TEXT BOOK/S:

Text Book:
Operating Systems
Publication: Cengage learning By Flynn/McHoes,

REFERENCE BOOKS:

1. OperatingSystemsConceptsPublication:PearsonHigherEducationBySilberschatz,Galvin&Gagne

2. OperatingSystems:InternalsandDesignPrinciples,5/EPublication:PearsonHigherEducation
By William Stallings

WEB RESOURCES:

https://www.tutorialspoint.com
http://codex.cs.yale.edu/avi/os-book/OS9/slide-dir/
https://users.dimi.uniud.it/~antonio.dangelo/OpSys/materials/Operating_System_Concepts.pdf
www.studytonight.com/operating-system/cpu-scheduling
https://www.cs.uic.edu/~jbell/CourseNotes/OperatingSystems/5_CPU_Scheduling.html
http://www2.latech.edu/~box/os/ch05.pdf

GUJARAT UNIVERSITY
BCA III SYLLABUS

COURSE TITLE	**STATISTICAL METHODS**
COURSE CODE	**CC-205**
COURSE CREDIT	**3**
Session Per Week	**4**
Total Teaching Hours	**40 HOURS**

AIM

To develop the skill about the basic statistics.
To develop the ability to find approximate solutions and/or answer by choosing correct statistical technique for a given problem.

LEARNING OUTCOMES

On the completion of the course students will:
1. Get a working knowledge of statistical methods.
2. Understand the use of statistical methods with computer related computational approach.
3. With statistical techniques so that they are prepared to apply the knowledge in the field of computer science.

DETAIL SYLLABUS

UNIT	TOPIC / SUB TOPIC	TEACHING HOURS
1	**Introduction and Measures of Central Tendency**	**10**
	Introduction: •Meaning of Statistics •Types of Statistical Methods •Scope or Importance of Statistics •Limitations of Statistics	**1**
	Measures of Central Tendency o Introduction • Characteristics of a Good Average. • Different Types of Measures of Central Tendency o Mean • Arithmetic Mean • Arithmetic Mean of Grouped Frequency Distribution • Short-cut Method and Step-Deviation Method of • Obtaining Arithmetic Mean (Excluding Mathematical Properties of A.M) • Combined Arithmetic Mean • Cumulative Arithmetic Mean • Advantages, disadvantages and uses of Arithmetic Mean, Geometric Mean, G. M, H.M. • Relation Among A.M.,G.M.,H.M. • Weighted Arithmetic Mean	**9**

	o Median • Individual Frequency Distribution • Ungrouped Frequency Distribution • Grouped Frequency Distribution • Advantages, disadvantages and uses of Median o Mode • Individual Frequency Distribution • Ungrouped Frequency Distribution • Grouped Frequency Distribution • Advantages, disadvantages and uses of Mode	
2	**Measures of Dispersion**	**10**
	• Quartiles, Deciles and Percentiles • Introduction, Objectives and essentials of a good measure	**1**
	o Absolute and Relative Measures of Dispersion o Range o Quartile Deviation • Advantages and disadvantages of Q.D. • Coefficient of Quartile Deviation	**2**
	o Mean Deviation • Coefficient of Mean Deviation • Advantages and disadvantages of M.D. o Standard Deviation • Alternative Method of Standard Deviation • Relationship among Q.D., M.D., S.D. • Advantages and disadvantages of S.D.	**5**
	o Variance (Excluding Properties of S.D) • Coefficient of Variation • Direct Method • Step-Derivation Method	**2**
3	**Probability and Probability Distribution**	**10**
	Probability: o Introduction o Definitions of Some Important Terms • Random Experiment • Trial Event • Favorable Cases • Equally Likely Events • Mutually Exclusive Events • Exhaustive Events • Dependent Events • Independent Events	**2**
	o Statistical approach to probability o Modern approach to probability o Symbols associated with probability o Algebra of sets o Conditional Probability o Theorems (Laws) of Probability(Without Proof) o Baye's Rule(only for two events)	**6**

	o Random Variable o Probability Distribution and its types o Binomial Distribution o Characteristics of Binomial Distribution	**2**
4	**Correlation Analysis And Regression Analysis**	**10**
	Correlation Analysis o Introduction o Types of Correlation • Positive, Negative and Zero Correlation • Linear and non-linear Correlation • Simple, Multiple and Partial Correlation • Positive, Negative and Zero Correlation • Methods of Measuring Correlation • Karl Pearson's Product Moment Method • Spearman's Rank Method	**6**
	Regression Analysis o Regression Equation. o Method of Least Squares. o The regression equation of Y on X o The regression equation of X on Y o Regression Coefficient & Its Properties (without proof) o Correlation Versus Regression	**4**

TEXT BOOK/S:

Business Statistics (Fourth Edition)
Publication: Vikas Publication House Pvt.Ltd.
By J.K.Sharma

Chapter- 1 (1.4 to 1.7)
Chapter- 3 (3.4 to 3.11)
Chapter- 4 (4.3, 4.4, 4.5.1, 4.5.2, 4.5.3)
Chapter- 6 (6.1 to 6.6)
Chapter- 7 (7.1, 7.2, 7.5.1)

REFERENCE BOOKS:

1. Business Statistics (Third Revised Edition)
   Publication: S.Chand
   By Padmalochan Hazarika
2. Business Mathematics and Statistics
   Publication: Tata McGraw Hill Education Private Limited
   By N G Das and J K Das

WEB RESOURCES:

REQUIRED SOFTWARE/S

GUJARAT UNIVERSITY
BCA III SYLLABUS

COURSE TITLE	**Data Structures Practicals**
COURSE CODE	**CC-206**
COURSE CREDIT	**3**
Session Per Week	**3**
Total Teaching Hours	**40 HOURS**

AIM

Student will be provided with practical knowledge of basic data structures, representation, building and use of various data structures in different applications in real world.

LEARNING OUTCOMES

1.) To gain the knowledge of various advanced data structure topics practically.
2.) To develop skills for effective use of the pointers and structures in programming.

Note

The students are expected to write program in "C or C++ Programming "languages unit wise as given below. The list in each unit is indicative only and **may or may not be asked in the examination.** The programs given below are only sample example for practice in lab.

DETAIL SYLLABUS

UNIT	TOPIC / SUB TOPIC	TEACHING HOURS
1	**Linked List** 1. Write program to implement following operations using Singly link list • Insert at first • Insert at Last • Insert at specified location (Before or After the Node) • Delete from first • Delete from last • Delete any specified node • Traversal • Sorting • Splitting • Merging • Counting Operations(Total no. of nodes, even and odd no. of nodes)	**10** **4**

1	2. Write program to implement following operations using Doubly link list • Insert at first • Insert at Last • Insert at specified location (Before or After the Node) • Delete from first • Delete from last • Delete any specified node • Traversal • Sorting • Splitting • Merging • Counting Operations(Total no. of nodes, even and odd no. of nodes)	**6**
2	**Searchin and Sorting**	**10**
	1. Write a program to implement sequential search. 2. Write a program to implement binary search.	**2**
	3. Write a program to implement bubble sort. 4. Write a program to implement selection sort 5. Write a program to implement merge sort 6. Write a program to implement quick sort 7. Write a program to implement insertion sort.	**8**
3	**Stack**	**10**
	• Stack: 1. Write a program to implement following operations in stack Using array and Linked List. • PUSH • POP • PEEP 2. Write a program to implement Evaluation of given postfix expression.	**5**
	3. Write a program to implement conversion of infix expression into postfix expression (parentheses and non parentheses). 4. Write a program to implement recursion. 5. Write a program to reverse the string using the stack.	**5**
4	**Queue and Tree**	**10**
	Queue: 1. Write a program to implement Simple Queue operations using Array and Linked List. • ENQUEUE • DEQUEUE • Traversal (display) 2. Write a program to implement Circular Queue operations Using Array. • ENQUEUE • DQUEUE • Traversal (display)	**5**

4	3. Write a program to implement following operations on Binary Search Tree using Linked List. • Creation • Insertion • Traversal(In-order, Pre-order, Post-order)	**5**

TEXT BOOK:

Data and File Structures using C Publisher: Oxford
By Reema Thareja

REFERENCE BOOKS:

1. Data Structures and Algorithms in C++ Publisher: Dreamtech
By B. M. Harvani
2. Magnifying Data Structures Publisher: PHI
By: Arpita Gopal
3. Data Structures using C & C ++ Publisher: Wiley-India
By : Rajesh K. Shukla
4. Introduction to Data Structures in C Publisher: Pearson Education
By: Ashok N. Kamthane
5. Data Structures Using C Publisher: Pearson Education By : A. K Sharma

REQUIRED SOFTWARE/S

Turbo c

GUJARAT UNIVERSITY
BCA III SYLLABUS

COURSE TITLE	**C++ Practicals**
COURSE CODE	**CC-207**
COURSE CREDIT	**3**
Session Per Week	**3**
Total Teaching Hours	**40 HOURS**

AIM

1.) To get in-depth practical knowledge of Object Oriented Programming language.
2.) To obtain practical knowledge of programming for real life applications.

LEARNING OUTCOMES

1. Understand the features of C++ supporting object oriented programming
2. Understand the relative merits of C++ as an object oriented programming language
3. Understand how to produce object-oriented software using C++
4. Understand how to apply the major object-oriented concepts to implement object oriented programs in C++, encapsulation, inheritance and polymorphism.
5. Understand advanced features of C++ specifically stream I/O, templates and operator overloading

DETAIL SYLLABUS

UNIT	TOPIC / SUB TOPIC	TEACHING HOURS
	Introduction to OOP, Classes & Objects	**10**
	1. Write a program to calculate the area of circle, rectangle and square using function overloading. **2.** Write a program to demonstrate the use of default arguments in function overloading. **3.** Write a program to demonstrate the use of returning a reference variable. **4.** Create a class student which stores the detail about roll no,name, marks of 5 subjects, i.e. science, Mathematics, English,C, C++. The class must have the following: • Get function to accept value of the data members. • Display function to display values of data members. • Total function to add marks of all 5 subjects and Storeit in the data members named total.	

1	**5.** Create a function power() to raise a number m to power n, the function takes a double value for m and int value for n,and returns the result correctly. Use the default value of 2 for n to make the function calculate squares when this argument is omitted. Write a main that gets the values of mand n from the user to test the function. **6.** Write a basic program which shows the use of scope resolution operator. **7.** Write a C++ program to swap the value of private data members from 2 different classes. **8.** Write a program to illustrate the use of this pointer. **9.** An election is contested by five candidates. The candidates are numbered 1 to 5 and the voting is done by marking the candidate number on the ballot paper. Write a program to read the ballots and count the votes cast for each candidate using an array variable count. In case a number is read outside the range of 1 to 5, the ballot should be considered as a 'spoilt ballot' and the program should also count the number of spoilt ballots. **10.** Write a program to call member functions of class in the main function using pointer to object and pointer to member function.	**10**
2	**Dynamic Memory Management, Constructor & Destructor, Inheritance** **1.** Using friend function find the maximum number from given two numbers from two different classes. Write all necessary functions and constructors for the program. **2.** Using a friend function, find the average of three numbersfrom three different classes. Write all necessary memberfunctions and constructor for the classes. **3.** Define currency class which contains rupees and paisa as data members. Write a friend function named AddCurrency( )which add 2 different Currency objects and returns a Currencyobject. Write parameterized constructor to initialize the values and use appropriate functions to get the details from the user and display it. **4.** Create Calendar class with day, month and year as data members. Include default and parameterized constructors to initialize a Calendar object with a valid date value. Define a function AddDays to add days to the Calendar object. Define a display function to show data in "dd/mm/yyyy" format. **5.** Create a class named 'String' with one data member of typechar *, which stores a string. Include default, parameterized and copy constructor to initialize the data member. Write aprogram to test this class. **6.** Write a base class named Employee and derive classes Male employee and Female Employee from it. Every employee has an id, name and a scale of salary. Make a function ComputePay(in hours) to compute the weekly payment of every employee. A male employee is paid on the number of days and hours he works. The female employee gets paid the wages for 40 hours a week, no matter what the actual hours are. Test this program to calculate the pay of employee.	**10**

7. Create a class called scheme with scheme_id, scheme_name,outgoing_rate, and message_charge. Derive customer classform scheme and include cust_id, name and mobile_no data.Define necessary functions to read and display data. Create amenu driven program to read call and message informationfor a customer and
display the detail bill.
8. Write a program with use of inheritance: Define a class publisher that stores the name of the title. Derive two classesbook and tape, which inherit publisher. Book class containsmember data called page no and tape class contain time forplaying. Define functions in the appropriate classes to get andprint the details.
9. Create a class account that stores customer name, account no,types of account. From this derive classes cur_acc and sav_acc to include necessary member function to do the following:
• Accepts deposit from customer and update balance
• Compute and Deposit interest
• Permit withdrawal and Update balance.
10. Write a base class named Employee and derive classes Male employee and Female Employee from it. Every employee has an id, name and a scale of salary. Make a functionComputePay (in hours) to compute the weekly payment ofevery employee. A male employee is paid on the number ofdays and hours he works. The female employee gets paid thewages for 40 hours a week, no matter what the actual hoursare. Test this program to calculate the pay of employee

	Virtual Functions, Operator Overloading	**10**
	1. Create a class vehicle which stores the vehicleno and chassisno as a member. Define another class for scooter, which inherits the data members of the class vehicle and has a data member for a storing wheels and company. Define another class for which inherits the data member of the classvehicle and has a data member for storing price and company. Display the data from derived class. Use virtual function. **2.** Create a base class shape. Use this class to store two doubletype values that could be used to compute the area of figures.Derive two specific classes called triangle and rectangle from the base shape. Add to the base class, a member function get_data() to initialize the base class data members and another member function display_area() to compute anddisplay the area of figures. Make display_area() as a virtual function and redefine this function in the derived class to suit their requirements.	

3	**3** Write a program to demonstrate the use of pure virtual function. **4** Create a class time with member data hour and minute. Overload ++ unary operator for class time for increment and -- unary operator for decrement in time object value. **5** Create a class string with character array as a data member and write a program to add two strings with use of operator overloading concept. **6** Create a class distance which contains feet and inch as a datamember. Overhead = =, <and> operator for the same class. Create necessary functions and constructors too. **7** Create a class MATRIX of size mxn. Overload + and – operators for addition and subtraction of the MATRIX. **8** Define a class Coord, which has x and y coordinates as itsdata members. Overload ++ and – operators for the Coordclass. Create both its prefix and postfix forms **9** Create one class called Rupees, which has one member data tostore amount in rupee and create another class called Paise which has member data to store amount in paise. Write a program to convert one amount to another amount with use of type conversion. **10** Create two classes Celsius and Fahrenheit to store temperaturein terms of Celsius and Fahrenheit respectively. Includenecessary functions to read and display the values. Defineconversion mechanism to convert Celsius object to Fahrenheitobject and vice versa. Show both types of conversions in mainfunction.	
	Templates, Files	**10**
4	**1** Write a program to create a function template for finding maximum value contained in an array. **2** Write a program to create a class template for the 'Array' class. **3** Create a template for the bubble sort function. **4** Write a program to create a function template for swapping the two value. **5** Write a program to illustrate the use of put(), get() and getline() functions for Text mode Input/Output. **6** Write a program to read character, integer and string from keyboard and write it in "data.txt" file and read from file in text mode. **7** Write a program to read your name and roll number from keyboard and write it in "mydata.txt " file and read from file in text mode. **8** Write a program to read product name and product price from keyboard and write it in "product.txt" file and read from file in text mode. **9** Write down a program to create a file temp.txt, write into the specific file than read the same data from the file **10** Write a program to create num.txt file which stores number. Find max value from a file nums.txt and print it on standard output device.	

TEXT BOOK/S:

1. Object Oriented Programming with C++
Publication: Pearson
By Subhash KU

REFERENCE BOOKS:

1. **Object-Oriented Programming with C++ (Second Edition)**
Publication: PHI
By Poornachandra Sarang
2. **Object Oriented Programming using C++**
Publication: Cengage Learning
By Joyce Farrell
3. **Object Oriented Programming In C++**
Publication: Wiley India Edition
By Rajesh K. Shukla

WEB RESOURCES:

REQUIRED SOFTWARE/S

Turbo C

Elective Course
EC-201(1) Soft Skills Development

Course Introduction:
In the age of liberalization, privatization and globalization, the need has arisen to inculcate such habits and attitudes which help students to adapt to the occupational set-ups. Such behavioral competencies are known as Soft Skills.

Objectives:
1.) To help students do well in academics.
2.) To motivate students to personal and professional growth.
3.) To provide students with tools for success and character building.

No. of Credits: 2
Theory Sessions per week: 2
Teaching Hours: 20

UNIT	TOPICS / SUBTOPICS
1	**Changing Ourselves to Change the World** • Understanding what are soft skills, • Realizing the need for personality growth and development for a better life and a better world, • Need for Soft Skills in today's world, • Learning to recognize our wants and our choices, Anticipating and understanding changes, • Preparing and dealing with change: Reacting to change in our lives; attitudinal barriers to change
2	**Time Management and Stress Management** • Importance of Time Management, How to regulate the way you spend time, Identifying and eliminating time wasters, Strategies for Managing Time, • Understanding stress: Causes of Stress and its consequences, Techniques to manage stress
3	**Reading Skills** • Importance of Reading • Pleasure of Reading • Types of Reading • Calculating Reading speed and Accuracy • Techniques to read faster and better • Technique of SQ3R, Practising Comprehension • How to identify the core ideas of reading material
4	**Writing and Speaking Skills** • Importance of writing effectively • Methods of writing better • Selecting a topic, Knowing your audience • Writing an outline, Researching, Organizing, Writing and revising drafts,

	• Making quick notes • Writing your resume and covering letter

Text Book:

The ACE of Soft skills
Publication: Pearson
By Gopalaswamy Ramesh, Mahadevan Ramesh

Corporate Skills
Publication: Rupa & Co 2010, New Delhi .
By Gulati, Sarvesh

Reference Books:

1. Soft Skill for Everyone
   Publication: Cengage
   By Jeff Butterfield

2. Contemporary Business Communication
   By Scott Ober

3. Business Communication Today
   By Bovee, Thill, Schazman

4. Enrich your English
   By CIEFL (Academic Skills book)

5. Contemporary English Grammar
   By Raymond Murphy

6. Essential English Grammar
   By Raymond Murphy

7. English and Soft skills
   Publication: Orient Blackswan
   By S.P.Dhanavel:

Elective Course
EC-201(2) Carbon Credit

No. of Credits: 2
Theory Sessions per week: 2
Teaching Hours: 20

Syllabus and text book as per B.S.C Syllabus Semester III Elective Course.

Elective Course
EC-201(3) Learning from Great Indian Thinkers

Course Introduction:
This course aims at revisiting the Indian culture with the objective of inspiring students to become better citizens. The course is designed to adopt any pedagogy suited to teach the values, ethics and works of some of the world renowned thinkers who have changed history and brought about a renaissance in the cultural and spiritual heritage of mankind.

No. of Credits: 2
Theory Sessions per week: 2
Teaching Hours: 20 hours

UNIT	TOPICS / SUBTOPICS
	Extracts from
1	• **Ancient India:(Any three)** o The Vedas o Stories from the Mahabharata o Ramayana and Bhagvad Gita o Tales from the Buddha's Life/Jataka o Tales from the life of Mahaveer/Jain stories and folklore o Upanishadic and Pauranic Stories o Extracts from the Sangam Literature, the Milinda Panho, the Arthasshastra, and the Charak Samhita o Foreign travelers account o Life stories of Panini, Gargi, Maitreyi, Aryabhatta o Varahmihira o Ashtavakra o Shankracharya o Charvak
2	**Extracts from life stories**
	• **Modern India(Any three)** o Raja Ram Mohan Roy o Iswar Chand Vidyasagar o Swami Dayanand, Saraswati o Swami Vivekananda o Rabindranath Tagore o P.C. Ray o Swami Sahajanand Saraswati o Sarvapalli Radhakrishnan o Sri Aurobindo o Veer Savarkar

	○ Sardar Patel ○ Bal Gangadhar Tilak ○ Gopal Krishna Gokhale ○ Mohandas Karamchand Gandhi ○ Subhashchandra Bose ○ Jawaharlal Nehru ○ Dr. Baba Saheb Ambedkar ○ Vinoba Bhave ○ Jayprakash Narayan ○ Sarojini Naidu ○ Madam Bhikaji Kama ○ Ram Manohar Lohia ○ FieldMarshall Manekshaw ○ Pandit Madan Mohan Malaviya
3	**Extracts from the life stories of** • **Contemporary Indian Leaders: (any three)** ○ K.R. Narayanmurthi ○ Azim Premji ○ A.P.J. Abdul Kalam ○ Jagdish chandra Bose ○ Ramanujan, Meghnad Saha ○ Vikram Sarabhai ○ Mother Teresa ○ Dhirubhai Ambani ○ J.R.D Tata ○ Ghanshyam Das Birla ○ L. N. Mittal ○ Subhash Chandra ○ Baba Amte, Varghese Kurien ○ Ela Bhatt ○ Medha Patkar ○ Nandan Nilekani, Gita Piramal, C.K. Prahlad ○ Case Study-Setting Goals at State Bank of Vermont
4	**Extracts from the life stories of** • **Philosophers(all eras) (any three):** ○ J. Krishnamurty ○ Rajneesh (Osho) ○ Ram krishna Paramhansa ○ Raman Maharshi ○ Amartya Sen ○ Maharshi Arvind

Elective Course
EC-201(4) Introduction to Indian Constitution

Course Introduction:
To create awareness of Fundamental Law of the land and generate common civic sense.

Objectives:
The Student will be able to:

1.) Understand the basic features of the Constitution of India, as set out in the Preamble.
2.) Identify your fundamental rights and learn how they can be enforced.
3.) See how the Directive Principles of State Policy influence the law makers of the country.
4.) Get an understanding of your fundamental duties.

No. of Credits: 2
Theory Sessions per week: 2
Teaching Hours: 20

UNIT	TOPICS / SUBTOPICS
1	**Introduction to Constitution of India**
	• The Background • Making of the Constitution • Basic Principles • The Philosophy of the Constitution
2	**More on Constitution of India**
	• Salient Features of the Constitution • Special Features of the Constitution • The Preamble • The Union and Its Territory • Citizenship
3	**Fundamental Rights & Duties**
	• Introduction of Fundamental Rights • Right to Equality • The Right to Freedom • The Right against Exploitation • The Right to Freedom of Religion • Cultural and Educational Rights • A Right to Constitutional Remedies • An Assessment • The Directive Principles of State Policy • Fundamental Duties
4	**Members In Parliament, Judiciary and Federalism**
	• The Union Executive • The Vice President and the Attorney-General • The Union Legislature – The Parliament of India • Legislative Procedure • The Union Judiciary – the Supreme Court • The Machinery of Government in the States

	• Judiciary in the States • The Federal System • Administrative Relations between the Union and the States • Financial Relations between the Union and the States • Inter-State Trade and Commerce

Textbook:

An Introduction to the Constitution of India
Publication: Vikas Publications
By Dr. M V Pylee

Reference Book:

1. Introduction to the Constitution of India
   Publication: PHI Publications
   By Brij Kishore Sharma

2. Introduction to the Constitution of India
   Publication: LexisNexis Publications
   By Durga Das Basu

GUJARAT UNIVERSITY
BCA III SYLLABUS

COURSE TITLE	**Digital Marketing**
COURSE CODE	**EC-201**
COURSE CREDIT	**2**
Session Per Week	**2**
Total Teaching Hours	**20 HOURS**

AIM

* To Provides comprehensive coverage of the developments and use of Internet as a marketing planning tool
* To Presents the ability of the digital world to increase efficiency in established marketing functions
* To Provides insights on how organizations can leverage the benefits of social media
* To Discusses cutting-edge business strategies such as differentiation, and cost leadership that generate revenue while delivering customer value
* To Includes both Indian as well as global case studies of companies such as Vodafone, Ford, Aviva India, Bacardi, Amazon

LEARNING OUTCOMES

On the completion of the course students will:
1.Understand the marketing in the digital era.
2. Understand the business drivers in the virtual world; such as social media, online branding, traffic building on web-site, e-commerce.
3.Understand the online tools for marketing.
4.To understand the contemporary digital revolution

DETAIL SYLLABUS

UNIT	TOPIC / SUB TOPIC	TEACHING HOURS
1	**Marketing in the Digital Era** * E-marketing * The Online Marketing Mix * The Online Consumer * Customer Relationship Management in a Web 2.0 World	**5**
2	**Business Drivers in the Virtual World** * Social Media * Online Branding * Traffic Building * Web Business Models * E-commerce	**5**
	Online Tools for Marketing	**5**

3	* Engagement Marketing through Content Management * Online Campaign Management * Consumer Segmentation, Targeting, and Positioning using Online Tools * Market Influence Analytics in a Digital Ecosytem	
4	**The Contemporary Digital Revolution** * Online Communities and Co-creation * The World of Facebook * The Future of Marketing Gamification and Apps	**5**

TEXT BOOK/S:

1. Digital Marketing
Publisher: Oxford University Press
Author: Vandana Ahuja

REFERENCE BOOKS:

WEB RESOURCES:

REQUIRED SOFTWARE/S

Foundation Course
FC-201(1) Principles of Management

Course Introduction:
The field of management has undergone a sea change and has today assumed a form of a profession with a well-defined body of knowledge. This knowledge is continuously evolving and new issues and findings are constantly emerging. This field is attracting many people who want to undergo a formal training in this area.

Objectives:
The student would be able

1.) To get a basic understanding with reference to working of business organizations through the process of management.
2.) To understand the managerial functions of planning and organizing.
3.) To discuss on the managerial functions of staffing, directing and controlling.

No. of Credits: 2
Theory Sessions per week: 3
Teaching Hours: 40 hours

UNIT	TOPICS / SUBTOPICS	TEACHING HOURS
1	**Introduction to Management, Planning and Organizing**	**10 hours**
	• **Management** o Meaning and process of management	
	• **Planning** o Meaning o Planning process o Planning premises o Types of plans – based on breadth and use.	
	• **Organizing** o Introduction o Meaning of organizing o Principles of organizing.	
2.	**More on Organizing and Staffing**	**10 hours**
	• **Departmentation** o Meaning	
	• **Bases of departmentation** o Function wise o Product wise o Territory wise o Process wise o Customer wise.	

	• **Delegation** o Meaning o Elements of delegation o Principles of effective delegation.	
	• **Centralization and decentralization** o Meaning o Factors affecting degree of centralization and decentralization.	
	• **Staffing** o Meaning o Human Resource Planning ▪ Meaning ▪ Importance o Job Analysis ▪ Meaning ▪ Importance o Recruitment ▪ Meaning ▪ Only sources of recruitment o Selection ▪ Meaning ▪ Only the selection process o Training ▪ Meaning ▪ Methods of training-job rotation o Lectures/conference vestibule(a short note on these)	
3	**Directing**	**10 hours**
	• **Meaning of directing** • **Principles of directing** • **Motivation** o Meaning o Theories of motivation ▪ Herzberg's Two-Factor theory ▪ McGregor's Theory X and Theory Y , Theory Z • **Leadership** o Meaning of leadership o Types of leadership ▪ Autocratic ▪ Democratic ▪ Theories of leadership-Blake and Mouton's ▪ Managerial grid ▪ Leadership continuum o Communication ▪ Meaning and Importance	

4	**Control**	**10 hours**
	• **Meaning and Nature of control** • **Importance of control** • **Control process** • **Essentials/principles of effective control system** • **Techniques of control-Break-Even Analysis**	

Textbook:

Principles of Management (Fifth Edition)
Publication: Tata McGraw Hill
By P C Tripathi, PN Reddy,

Reference Book:

1. Fundamental of Management, Concept, application, skill development
   Publication: Cengage Learning
   By Robert N. Lussier

2. Entrepreneurship and Managemen
   Publication: Pearson
   By: S. Nagendra, VS Manjunath

3. Management-Concept, Practice and Cases
   Publication: Tata McGraw Hill(first Edition-2010)
   By: Karminder Ghuman and K. Aswathapa

Foundation Course
FC-201(2) Mass Communication

Course Introduction:

With the advances in ICT, the new methods of mass communication have been developed. More and more, radio, TV channels as well as news papers are been made available to the society. Since, the student having good knowledge of ICT will have openings in mass media field. It is essential that the student should know different aspects of mass media and communication. This subject makes an attempt to expose the students to the role of electronic and print media, in corporate as well as societal communication.

Objectives:

1.) To gain understanding of mass communication and its processes.
2.) To become aware of the effects of mass media upon society.
3.) To understand the theoretical underpinnings and ethical standards within mass media fields.
4.) To enhance media literacy.
5.) To learn about the norms and practices within mass media fields.

No. of Credits: 2
Theory Sessions per week: 3
Teaching Hours: 40

UNIT	TOPICS / SUBTOPICS	TEACHING HOURS
1	**Mass Communication: An Overview**	**10 hours**
	• Mass Communication & Society • Uses & Effects • Content of Media • Impact o f Mass Media on children, women & others • Target Audience & Objectives • Cultural Context & Psychology • Technology in Communication • Various Media • Convergence & New Media: E-Commerce, E-learning • Effective Presentation Skills	
2	**Print Media & Corporate Communication**	**10 hours**
	• Newspapers • Magazines • What is news? • News Values, Types & Sources • Role of Editors & Reporters • Technology used in print media • Content analysis of newspaper • What is Corporate Communication? • In-house Communication • Corporate Identity: Definition & Types	

3	**Radio**	**10 hours**
	• Importance of Spoken words • Strength & Weaknesses of Radio as a Medium • Functioning of Radio Stations • Public & Private Radio Stations • Different Production Formats & Genres • Technology in Radio • Ethics in Broadcasting	
4	**Television**	**10 hours**
	• Basics of Photography • Early Experiments of Television (SITE, KCP, Jhabua project,etc) • Developing Ideas & Script Writing • TV Production Formats • Planning & Budgeting • Camera Compositions, Framing, Movements • Editing • Television Crew & Functioning of Studio • E-Content	

Reference Book:

1. Mass Communication in India
   Publication: JAICO Publications
   By Keval J. Kumar

Cyber Law

About the course: Development of Cyber law is a recent phenomenon. It is still in a nascent stage and continuously evolving every passing day. Even the most learned legal luminaries find it difficult to solve the legal problems posed by technology. India has emerged as a hub of the IT industry due to the phenomenal growth of the IT sector. However, this huge growth rate has brought with it the inevitable legal complications due to a switch over from paper-based commercial transactions to e-commerce and e-transactions.

The purpose and object of the course:

To introduce the cyber world and cyber law in general

To explain about the various facets of cyber crimes

To enhance the understanding of problems arising out of online transactions and provoke them to find solutions

To clarify the Intellectual Property issues in the cyber space and the growth and development of the law in this regard

To educate about the regulation of cyber space at national and international level

Syllabus:

The syllabus is divided in four units:

Unit 1: Internet, E-Commerce and E-Governance with Reference to Free Market Economy

- Modern Era: The scene and problems
- Need for Cyber Laws
- What is E-commerce? Various Modes of E-commerce
- Illustrative cases about cyberspace jurisdiction
- Basic laws of Digital and Electronic Signature in India

Unit II: Law Relating to Electronic Records and Intellectual Property Rights in India

- Legal aspects of electronic records/ digital signatures
- The roles and regulations of certifying authorities in India
- Protection of intellectual property rights in cyberspace in India

Unit III: International efforts relating to cyberspace laws and cyber crimes

- International efforts related to cyberspace laws
- Council of Europe convention on cyber crimes

Unit IV: Penalties, compensation and offences under the cyberspace and Internet in India

- Penalties, compensation and adjudication of violations of provisions of IT Act and judicial review
- Some important offences under the cyberspace law and the internet in India

- Miscellaneous provisions of IT act and conclusions

Textbook:

Cyber Laws and IT Protection by Harish Chander

Publication: PHI Learning PVT LTD

Reference Books:

1) Textbook on Cyber Law by Pavan Duggal

Publication: Universal Law Publishing

2) Cyber Law: Law of Information Technology and Internet by Anirudh Rastogi

Publication: LexisNexisa