

SAURASHTRA UNIVERSITY, RAJKOT.

Syllabus of B.Sc. Semester-1(Computer Application)
According to Choice Based Credit System
Effective from June – 2019

*(Updated on date:- 06-04-2019
and updation implemented from June - 2019)*

• Program:	B.Sc.
• Semester:	1
• Subject:	Computer Application
• Title :	Computer Fundamentals and Programming in C.
• Paper No :	CA-101 - Theory
• Marks for External Examination:	(Short Questions) → 20 Marks (Descriptive type) → 50 Marks <hr/> Total Marks → 70 Marks
• Marks for Internal Examination:	Assignments → 30 Marks or Test
• Credit Of The Course	4 Credits

B.Sc. SEMESTER - 1

CA-101: Computer Fundamentals and Programming in C

Objective: Through this subject students will learn about computer fundamentals and Emerging Technologies and will learn about the fundamental of C programming language (Procedure Oriented Programming - POP).

Unit No.	Topic	Details
1	Introduction to computers	<ul style="list-style-type: none"> • Basic of Computers. <ul style="list-style-type: none"> ○ What is Computer?, Characteristics of Computer ○ Data Processing Cycle (Data → Process → information) • Classification of Computer <ul style="list-style-type: none"> ○ Analog, Digital and Hybrid Computers • History and Generations of Computers, Motherboard(PCI,USB, RAM, ROM) • Classification of Computer by Processing Capabilities <ul style="list-style-type: none"> ○ Micro, Mini, Mainframe and Super Computers
	Numbering System and Codes	<ul style="list-style-type: none"> • Introduction to Binary Codes <ul style="list-style-type: none"> ○ Nibble, Bit, Byte , Carry Bit, Parity Bit, Sign Bit ○ KB/MB/GB/TB etc. • Types of Numbering System <ul style="list-style-type: none"> ○ Binary/Octal/Decimal/Hexadecimal • Conversion <ul style="list-style-type: none"> ○ Binary to Octal, Decimal and Hexa-Decimal ○ Decimal to Binary, Octal and Hexa-Decimal ○ Octal to Binary, Decimal and Hexa-Decimal ○ Hexa-Decimal to Binary, Octal and Decimal • Binary Arithmetic <ul style="list-style-type: none"> ○ Addition, Subtraction, Multiplication, Division • Types of Codes <ul style="list-style-type: none"> ○ ASCII, BCD, EBCDIC, Unicode
2	Emerging Technologies and Virus	<ul style="list-style-type: none"> Different Communication Methods <ul style="list-style-type: none"> ○ GIS, GPS, CDMA, GSM • Communication Devices <ul style="list-style-type: none"> ○ Cell Phones , Modem, Infrared /Bluetooth/WiFi/LiFi/SLM(Spatial Light Modulator) • Virus <ul style="list-style-type: none"> ○ Introduction to Virus and related terms ○ Origin and History ○ Types of Virus ○ Problems and Protection from Virus • Cloud Computing <ul style="list-style-type: none"> ○ What is Cloud Computing?
	Important Terms of Computer	<ul style="list-style-type: none"> • Drive / Directory (Folder) / File / Path • Hard Copy / Soft Copy • Menu / Popup Menu • Backup & Restore, EMAIL, CLI, GUI, Compiler and Interpreter • Speed (MHz, GHz, CPS, CPM, LPM, DPI, PPM, KBPS, MBPS)

3	Pre-Programming Technique	<ul style="list-style-type: none"> • Introduction to Programming Languages <ul style="list-style-type: none"> o Introduction to Machine level language o Introduction to Assembly language o Introduction to Higher level language o Limitations and Features. • Tools and Techniques of Problem Analysis <ul style="list-style-type: none"> o Algorithm Development and Flowchart
	Getting Started With 'C' Language	<ul style="list-style-type: none"> o History and Basic Structure of C o Executing C program o Character set & C Tokens o Identifiers & Keywords o Data Types o Constants and Variables, scope of variable o Type Casting, Comments o Types of Operators. o Operator Precedence, pre-processors in C.
4	Console based I/O and built in functions.	printf(), scanf(), clrscr(), getch(), getchar(), gets(), puts(), getc(), putc(), putchar(), strcpy(), strcat(), strlen(), strcmp(), sqrt(), pow(), ceil(), floor(), isdigit(), islower(), isupper(), toupper(), tolower(), abs(), free(), exit()
	Decision Making and Looping Structure.	<ul style="list-style-type: none"> o if, if...else, nested if, switch o for, while, do...while, nested loop o break, continue, goto statements.
5	Array, Pointer, and structure.	<ul style="list-style-type: none"> o One, Two – Dimensional Array o Initialization and working with Array o Introduction to Pointer, Use of pointers o Introduction to Structure and Use of structure
	UDF	<ul style="list-style-type: none"> o Types of User Defined Functions. o Function call by reference and call by value o Recursion o Nesting functions.

Notes:

- There shall be **SIX** periods of 55 minutes per week for Computer Application- **CA-101 Theory**.
- There shall be one question paper of 70 marks & $2\frac{1}{2}$ hours for Computer Application- **CA-101 Theory**.

Format of Question Paper

- There shall be FIVE questions from each unit of 14 marks each.
- Each Question will be of the following form.

Question	(A) Answer any four out of four (Short answer type question)	4 Marks
	(B) Answer any one out of two	2 Marks
	(C) Answer any one out of two	3 Marks
	(D) Answer any one out of two	5 Marks
	TOTAL	14 MARKS

Reference Books:

- (1) Computer Fundamentals – By P.K. Sinha.
- (2) Programming in ANSI C Author – E. Balagurusamy
- (3) Teach yourself assembler - By Goodwin.
- (4) Let Us C Author: Yashwant Kanetkar.

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• Programme:	B.Sc.
• Semester:	1
• Subject:	Computer Application
• Paper No:	CA-101 - Practical
• Title of Course:	Computer Application Practical
• Total Marks of External Practical Examination:	35 Marks
• Total Marks of Internal Practical Examination:	15 Marks Continuous internal assessment of practical work
• Total Marks of Practical Examination:	External → 35 Marks Internal → 15 Marks <hr/> Total → 50 Marks
• Credit Of The Course	3 Credits

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Syllabus of B.Sc. Semester-2 (Computer Application)
According to Choice Based Credit System
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*(Updated on date:- 06-04-2019
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• Program:	B.Sc.
• Semester:	2
• Subject	Computer Application
• Title:	Advanced C and Object Oriented Programming using C++.
• Paper No:	CA-201- Theory
• Marks for External Examination:	(Short Questions) → 20 Marks (Descriptive type) → 50 Marks <hr/> Total Marks → 70 Marks
• Marks for Internal Examination:	Assignments → 30 Marks or Test
• Credit Of The Course	4 Credits

B.Sc. SEMESTER - 2

CA-201 Advanced C and Object Oriented Programming using C++.

Objective: Through this subject students will learn about data structure using searching and sorting, stack, queue, and linked list. And also learn about Object Oriented Programming using C++.

Unit No.	Topic	Details
1	Introduction to Data Structure.	Introduction, Linear and Non-Linear data structure. Searching Techniques (Linear Search, Binary Search). Sorting Techniques (Bubble sort, Selection sort). Introduction of prefix, infix and postfix expressions.
	Stacks, Queues and Linked List	Operation and Implementation of Stack Using Array Representation). Operation and Implementation of Simple and Circular Queue (PUSH, POP). Implementation of Singly Linked List.
2	Introduction to C++	Basic concept of Object Oriented Programming. Benefits and Applications of OOP. History and Introduction to C++, C++ input and output, structure of C++ program, keywords of C++, Data types and Basic functionality of C++, Operators in C++, , Scope Resolution operator, Default Arguments, Inline Functions, function overloading.
	Classes and Objects.	Specifying a Class and Objects in C++, Defining member functions, static data members and static member functions, Array of objects, friendly functions.
3.	Constructor and destructor	Characteristic of constructor, Types of constructor (default, parameterized and copy constructors). Destructor, characteristic of destructor.
	Inheritance	Introduction of inheritance, Defining derived classes, Single inheritance, visibility of inherited members, multilevel inheritance, multiple inheritance, virtual base classes, and abstract class.
4	Polymorphism and Operator Overloading	Introduction to polymorphism, virtual functions, Introduction of Operator overloading, Defining Operator Overloading, Overloading Unary Operators. Rules for Overloading Operators.
	Managing Console I/O operations	C++ Streams, Stream Classes, put() and get() functions, getline() and write() functions, formatted console I/O operations, width(), precision(), fill(), formatting flags in setf(), setw(), setprecision(), setiosflags()
5	Working with files	Introduction, classes for file stream operations, opening and closing files, working with single file, opening file using open(), reading from two files simultaneously, file modes.
	Exception handling	Introduction of exception handling, Exception handling mechanism, Multiple catch statements, specifying exceptions.

Notes:

- There shall be **SIX** periods of 55 minutes per week for Computer Application - **CA-201 Theory**.
- There shall be one question paper of 70 marks & $2\frac{1}{2}$ hours for Computer Application- **CA-201 Theory**.

Format of Question Paper

- There shall be FIVE questions from each unit of 14 marks each.
- Each Question will be of the following form.

Question.	(A) Answer any four out of four (Short answer type question)	4 Marks
	(B) Answer any one out of two	2 Marks
	(C) Answer any one out of two	3 Marks
	(D) Answer any one out of two	5 Marks
	TOTAL	14 MARKS

Reference Books:

- 1 Bjarne Stroustrup, "The C++ Programming Language", 4th Edition, Addison-Wesley, 2013.
- 2 Stanley B. Lippman, Josee Lajoie, Barbara E. Moo, "C++ Primer", Published by Addison-Wesley, 5th Edition, 2012
- 3 Adam Drozdek, "Data Structures and algorithm in C++", Third Edition, Cengage Learning, 2012.
- 4 Data Structure through C/C++ Author : Tennaunbuam.
- 5 "Data Structure Using C" by A K Sharma
- 6 "Data Structures and Program Design in C" by Kruse Robert L

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• Semester:	2
• Subject:	Computer Application
• Paper No:	CA-201 - Practical
• Title of Course:	Computer Application Practical
• Total Marks of External Practical Examination:	35 Marks
• Total Marks of Internal Practical Examination:	15 Marks Continuous internal assessment of practical work
• Total Marks of Practical Examination:	External → 35 Marks Internal → 15 Marks <hr/> Total → 50 Marks
• Credit Of The Course	3 Credits