Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Structure and Curriculum of Four Year Multidisciplinary Degree (Honors) Programme with Multiple Entry and Exit option

Undergraduate Programme of Science and Technology

B.Sc. (Degree) in Computer Application

Board of Studies

in

Computer Application

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

w.e.f. June, 2023

(In Accordance with NEP-2020)

Review Statement

The NEP Cell reviewed the Curriculum of **B.Sc. (Degree) in Computer Application** to be effective from the **Academic Year 2023-24.** It was found that, the structure is as per the NEP-2020 guidelines of Govt. of Maharashtra.

Date: 18/07/2023

Place: Latur

NEP CELL

Rajarshi Shahu Mahavidyalaya, Latur

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CERTIFICATE

I hereby certify that the documents attached are the Bonafide copies of the curriculum of **B.Sc. (Degree) in Computer Application** Programme to be effective from the **Academic Year 2023-24.**

Date: 14/07/2023

Place: Latur

(V.D. Panchal)
Chairperson
Board of Studies in Computer Application
Rajarshi Shahu Mahavidyalaya, Latur
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Shiv Chhatrapati Shikshan Sanstha's

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Under the Faculty of Science and Technology

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14	**Mr. Manoj Birajdar**	Member	Faculty Member
15	**Dr. Dnyaneshwar Rathod**	Member	Member from same Faculty

From the Desk of the Chairperson…

It is the great pleasure and honor that I share the syllabi for First Year of B.C.A (Degree) under NEP-2020 which will be implemented from the academic year 2023-24.

While framing the syllabus draft, the feedbacks received from stakeholders, the technological advancements and global industrial requirements are considered.

The department is dedicated to offering a helpful, welcoming, and demanding learning environment. In general, it aspires to become a hub of excellence in education, producing knowledgeable workers who will contribute to the nation's growth sustainably and improve people's lives through technology. Our goal is to help the students become globally competent by strengthening their problem-solving abilities and exposing them to the newest advancements in the field of computer applications and information technology.

The Bachelor of Computer Applications (BCA) is made available through the Department of Information Technology. The programme is made to give new students the basic and advanced knowledge of computer and its applications that are required by business and academia to address current issues.

The department has a team of passionate academic staff with sound technical support staff. The faculty members of Department have very teaching experience and are sound knowledge in their respective areas.

I acknowledge with gratitude all the guidance given by our Principal, Dr. Mahadev Gavhane and Vice Principal Prof. Sadashiv Shinde during the course of framing the syllabus under NEP-2020.

I also acknowledge with gratitude all the members of the Board of Studies for their valuable suggestions and contributions in designing all the courses of first year of this programme.

I am sincerely appreciated to all who are involved in the process of syllabus designing.

Thank you.

(Mr. Vishwanath D Panchal)

Chairperson

Board of Studies in Computer Application

Shiv Chhatrapati Shikshan Sanstha's

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Faculty of Science and Technology

Structure for Four Year Multidisciplinary Undergraduate Degree Programme in Computer Application Multiple Entry and Exit (In accordance with NEP-2020)

Year & Level	Sem	Major		Minor	OE	VSC/ SEC (VSEC)	AEC/ VEC	OJT,FP,CEP, RP	Credit per Sem.	Cum./Cr. per exit
		DSC	DSE							
1	**2**	**3**		**4**	**5**	**6**	**7**	**8**	**9**	**10**
I 4.5	I	DSC I: 04 Cr. DSC II: 04 Cr.	NA	NA	OE-I: 04 Cr.	VSC-I: 02 Cr. SEC-I: 02 Cr.	AEC-I MIL: 02 Cr. VEC-I: 02 Cr.	CC-I: 02 Cr. (NSS, NCC, Sports, Cultural)/ CEP-I: 02 Cr. (SES-I)/ OJT: 02 Cr. / Mini Project: 02 Cr.	22	44 Cr. UG Certificate
	II	DSC III: 04 Cr. DSC IV: 04 Cr.	NA	NA	OE-II: 04 Cr.	VSC-II: 02 Cr. SEC-II: 02 Cr.	AEC-II MIL: 02 Cr. VEC-II: 02 Cr.	Generic IKS: 02 Cr.	22	
	Cum. Cr.	16	-	-	08	04+04=08	04+02+02=08	04	44	
Exit Option: Award of UG Certificate in Major with 44 Credits and Additional 04 Credits Core NSQF Course / Internship or continue with Major and Minor										

Abbreviations:

1.	DSC	: Discipline Specific Core (Major)
2.	DSE	: Discipline Specific Elective (Major)
3.	DSM	: Discipline Specific Minor
4.	OE	: Open Elective
5.	VSEC	: Vocational Skill and Skill Enhancement Course
6.	VSC	: Vocational Skill Courses
7.	SEC	: Skill Enhancement Course
8.	AEC	: Ability Enhancement Course
9.	MIL	: Modern Indian Languages
10.	IKS	: Indian Knowledge System
11.	VEC	: Value Education Courses
12.	OJT	: On Job Training
13.	FP	: Field Projects
14.	CEP	: Fostering Social Responsibility & Community Engagement (FSRCE)
15.	CC	: Co-Curricular Courses
16.	RP	: Research Project/Dissertation
17.	SES	: Shahu Extension Services

Programme Outcomes (POs) for B.Sc. Programme	
PO 1	Learn the foundational ideas, fundamental ideas, and scientific theorems related to the fundamental science subjects and their application to daily life.
PO 2	Improve interpersonal relationships, life skills, and communication, and raise levels of living
PO 3	Acquired the knowledge with facts and figures related to various papers in Information Technology and Computer Science
PO 4	Apply the problem solving skills using programming languages
PO 5	Recognize that seeking knowledge is a lifetime endeavor that can help you succeed in life.
PO 6	Become role models to the younger generation in Application / Web Development
PO 7	Pursue higher education after completing this course.
PO 8	Work in various multinational companies / establish their own startup.

Programme Specific Outcomes (PSOs) for B.Sc. Computer Application (Degree)	
PSO No.	After completion of this programme the students will be able to-
PSO 1	An ability to communicate effectively by oral, written, computing and graphical skills and presentation.
PSO 2	An ability to enhance the application of knowledge of theory subjects in diverse fields.
PSO 3	Preparing students in various disciplines of technologies such as computer applications, computer networking, software engineering, Web Technologies, JAVA, database concepts and programming
PSO 4	Enhances programming skills of the young IT professionals through project development in each language/technology learnt during the programme
PSO 5	To enhance logical ability and programming concepts by implementing programming lab
PSO 6	Preparing students for future aspects by building and improving their creativity, social awareness, and general knowledge
PSO 7	Ability to identify, formulate, analyse and solve problems of programming using different languages.
PSO 8	Encouraging students to convert their start-up idea to reality by implementing it to become a software entrepreneur.
PSO 9	An ability to communicate effectively by oral, written, computing and graphical skills and presentation.

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Department of Information Technology

B.Sc. (Degree) Computer Application

Year & Level	Semester	Course Code	Course Title	Credits	No. of Hrs.
I 4.5	I	101COA1101 (DSC-I)	Problem Solving Through C	03	45
		101COA1103	Lab Course-I	01	30
		101COA1102 (DSC-II)	Understanding Computers	03	45
		101COA1104	Lab Course-II	01	30
		GE-I	From Basket	04	60
		101COA1501 (VSC-I)	Digital Logic	02	45
		(SEC-I)	From Basket	02	30
		(AEC-I)	From Basket	02	30
		(VEC-I)	Constitution of India	02	30
		AIPC/OJT-I	Case Study	02	60
	Total Credits			**22**	
	II	101COA2105 (DSC-III)	Object Oriented Programming Through C++	03	45
		101COA2107	Lab Course-III	01	30
		101COA2106 (DSC-IV)	Internet Programming	03	45
		101COA2108	Lab Course-IV	01	30
		GE-II	From Basket	04	60
		101COA2502 (VSC-II)	Basics of Statistics in Computer Application	02	45
		(SEC-II)	From Basket	02	30
		(AEC-II)	From Basket	02	30
		(VEC-II)	FSRCE (CBPR)	02	30
		Generic IKS	Introduction to Indian Knowledge System	02	60
	Total Credits			**22**	
Total Credits (Semester I & II)				**44**	

Curriculum

Major and VSC Courses

Semester - I

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Department of Information Technology

Course Type: DSC-I

Course Title: Problem Solving Through C

Course Code: 101COA1101

Credits: 03 **Max. Marks: 75** **Lectures: 45 Hrs.**

Learning Objectives:

LO 1. To get knowledge about algorithm/flowchart to find solution on an problem

LO 2. To writing C programs with branching and looping statements, which uses Arithmetic, Logical, Relational operators

LO 3. To work with arrays, structure or union for storing the data

LO 4. To understand modularity while written programs in C.

LO 5. To use pointers in various concepts like arrays, structures and functions

Course Outcomes:

After completion of the course, students will be able to-

CO 1. Analyze a computational problem and develop an algorithm/flowchart to find its solution

CO 2. Develop readable C programs with branching and looping statements, which uses Arithmetic, Logical, Relational operators

CO 3. Design readable C programs with arrays, structure or union for storing the data to be processed

CO 4. Apply concepts of modules / functions in the C programe

CO 5. Develop applications in C Language which will make use of pointers for array, functions, structures etc.

Unit No.	Title of Unit & Contents	Hrs.
I	**Basics of C Language**	**8**
	1. **Overview of C:** Introduction to Flowchart and algorithm, Importance of C, Sample 'C' programs, Basic structure of C programming, Executing a 'C' program, 2. **Data Types in C:** C tokens, Keywords, Identifiers, Constants, Variables, Data types, Declaration of variables, Assigning values to variables, Defining symbolic constants, Simple Programs	

Unit No.	Title of Unit & Contents	Hrs.
	3. **Input and Output statements:** Input and Output statements, Reading character, Writing character, formatted input, formatted output statements.	
	Unit Outcomes: UO 1. Design flowchart/ algorithm for given problem UO 2. Develop simple programmes using input and output statements.	
II	**Operators, Expressions and Programming Constructs**	**15**
	1. **Operators and Expressions:** Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment and Decrement operators, Conditional operators, Bitwise operators, Special operators, Type Conversion in expressions, Operator precedence, 2. **Library Functions:** Mathematical functions 3. **Branching and Looping**: Simple 'if' statement, Simple, Nested, Ladder 'if–else' statement. The 'Switch' statement, break, continue, goto, exit statement, 'While' statement, 'do-while' statement, 'for' statement, Simple programs on branching and looping, Nesting of loop.	
	Unit Outcome: UO 1. Develop C programs which uses Arithmetic, Logical, Relational operators UO 2. Design and develop programmes with branching and looping statements	
III	**Arrays and String Handling**	**10**
	1. **Arrays:** Introduction, One dimensional, Two dimensional and Multidimensional arrays, Initialization of arrays, 2. **Handling of Character Strings:** Declaring and Initializing string variables, reading string from terminal, writing string to screen, Arithmetic operations on characters, Comparison of two strings, 3. **String handling functions:** String functions & string.h file.	
	Unit Outcomes: UO 1. Apply the concepts of arrays to implement concepts of data structure UO 2. Efficiently implement string functions during the application	
IV	**Pointers, Structure and Functions**	**12**
	1. P**ointers:** Understanding Pointers, Accessing the address of variables, Declaring and initializing pointers, Accessing a variable through its pointers. 2. **Structure and Union:** Introduction, Defining Structure, declaring structure variables and structure members, arrays as structure, arrays within structure,	

Unit No.	Title of Unit & Contents	Hrs.
	Union. 3. **Functions:** Definition of function. Return values and their types, Function calls, Function declaration, Categories of function explanation with example, Nesting of function, Recursion, Command line argument	
	Unit Outcomes: UO 1. Abel to develop applications which will make use of pointers for array UO 2. Develop programe / application by using functions, structures etc.	

Learning Resources:

1. Programming in ANSI C, E. Balgurusamy, Tata McGraw Hill
2. Let us C,Yashwant Kanitkar, BPB Publication
3. Programming in C, V. Rajaraman, PHI Publication
4. The C Programming Language, Kernighan &Ritche, PHI Publication
5. Programming in C, P.B. Kottur,Sapna Book House
6. Programming with ANSI and TURBO C, Kamthane, Pearson Education
7. https://www.w3schools.com/c/
8. https://www.tutorialspoint.com/cprogramming/index.htm
9. https://www.programiz.com/c-programming

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Department of Information Technology

Course Type: Lab Course

Course Title: Lab Course –I (Problem Solving Through C)

Course Code: 101COA1103

Credits: 01 **Max. Marks: 50** **Hours: 30**

Leaning Objectives

LO 1. To understand the basic fundamentals and structure of C programming

LO 2. To study various data types, arrays and functions in C

LO 3. To understand input-output and, control and iterative statements in C

LO 4. To develop the skills of C Programming

LO 5. To improve the logical thinking skills

Course outcomes

After completion of course the student will be able to-

CO 1. Write programs using appropriate data types and control structures in C

CO 2. Make a detailed study of the different decision-making structures and loop control structures

CO 3. Understand and analyze various problem-solving methods

CO 4. Develop programs using concept of Arrays, Structures, pointers and functions

Practical No.	Unit
1	Write a C program to find the area of a circle. Accept radius from user
2	Develop C program to convert temperature in Fahrenheit to Celsius and Celsius to Fahrenheit
3	Write a C program to find the area of a rectangle. Input length and breadth from user
4	Write a C program to find the common division of two integer numbers
5	Write a C program to check whether the number is even or odd
6	Prepare a C program to read any three integers and display smallest among them using if statement
7	Develop a simple calculator with addition, subtraction, multiplication, division using switch case in C.
8	Write a C program to print number from 1 to 100 which are divisible by 5 and display their sum and count using for loop

9	Write a C program to check whether given number is palindrome or not using loop
10	Write a C program the pattern given below using nested for loop 1 12 123 1234 12345
11	Write a C program to read integers into an array and find sum of all numbers.
12	Handle any five string functions using C programe
13	Create an application to make use of pointers
14	Write a programe to make use of structure in C
15	Write a C program to make use of user define function

N.B.: Any Ten Practical from above.

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Department of Information Technology

Course Type: DSC-II

Course Title: Understanding Computers

Course Code: 101COA1102

Credits: 03 **Max. Marks: 75** **Lectures: 45 Hrs.**

Learning Objectives

LO 1. To understand fundamental computational concepts underlying most programming languages

LO 2. To acquire working practices appropriate for a professional programmer and skills supporting the solution of small problems.

LO 3. To study Computing Science in independent way.

LO 4. To identify various types of computer parts.

LO 5. To work with different types of operating systems.

Course Outcomes:

After completion of the course, students will be able to-

CO 1. Identify the parts of the computer system

CO 2. Efficiently handle conversation logic of number system

CO 3. Adequately explain functioning of computer components

CO 4. Explain the process of problem solving using computer

CO 5. Identify the software types and operating system types and efficiently work with Windows, Linux Operating System

Unit No.	Title of Unit & Contents	Hrs.
I	**Computer System & Data Representation within Computer**	12
	1. Introduction to Computer System 1.1. Introduction 1.2. Basic structure, ALU memory, CPU, I/O devices 1.3. Generations of computer 1.4. Evolution of computer 1.5. Classification of computers: Note book computers, personal computers, workstation, micro, mini ,mainframe, supercomputer **2. Data Representation within Computer**	

Unit No.	Title of Unit & Contents	Hrs.
	2.1. Bit, Byte, Word 2.2. ASCII, EBCDIC, BCD code 2.3. Introduction to number system: Decimal, Binary, Octal, Hexadecimal	
	Unit Outcome: UO 1. Identify the parts and types of computers UO 2. Efficiently handle conversation logic of number system	
II	**Input Output Devices & Memory**	**12**
	1. Input Output Devices 1.1. Input Devices: Keyboard, Point & Draw Devices, Data Scanning devices, Digitizer, Electronic Card Reader, Voice Recognition devices 1.2. Output Devices: Monitor, Printer, Plotter, Screen Image projector, voice response system. **2. Memory** 2.1. RAM, ROM, PROM, EPROM, EEPROM 2.2. Base Memory, Extended memory, expanded memory, cache memory 2.3. Storage devices: Tape, FDD, HDD, CDROM	
	Unit Outcome: UO 1. Identify and work with various types of IO devices UO 2. Abel to differentiate memory / storage of computers	
III	**Computer Software & Introduction to Operating System**	**10**
	1. Computer Software 1.1. Definition of software 1.2. Types of software 1.3. Compilers, Interpreters, Assemblers, Linkers, Loaders **2. Introduction to Operating System** 2.1. Introduction 2.2. Main function of operating system 2.3. Files and directories 2.4. Types of OS	
	Unit Outcomes: UO 1. Identify the software types and operating system types	
IV	**Study of Operating systems**	**11**

Unit No.	Title of Unit & Contents	Hrs.
	1. Study of Operating systems 1.1. Introduction to DOS 1.2. File and directory structure under DOS 1.3. Introduction to WINDOWS and Study Windows O.S. 1.4. Introduction to LINUX **2.** Introduction to Office Applications 2.1 Introduction to Word Processor Application 2.2 Introduction to Spread Sheet Solution Application 2.3 Introduction to Presentation Application	
	Unit Outcome: UO 1. Work with Windows, Linux and DOS operating system	

Learning Resources:

1. Fundamentals of Computer Science, P.K. Sinha, BPB Publication, Sixth Edition, 2017
2. Fundamentals of Computer Science, V.Rajaraman, PHI Learning Pvt. Ltd., 2015
3. Fundamentals of Computers, E Balagurusamy, Mc Graw Hill
4. Fundamentals of Computers and Information System by Niranjan Shrivastava, Wiley India, 2013
5. Computer Fundamentals, Anita Goel,Pearson Education, 2010
6. Fundamentals of Computers, Reema Thareja, Oxford,2014
7. Fundamentals of Information Technology, Chetan Srivastava, Kalyani Publishers, Third edition, 2010
8. Introduction to Computers, Peter Norton, Tata McGraw Hill, 1995

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Department of Information Technology

Course Type: Lab Course

Course Title: Lab Course –II (Understanding Computers)

Course Code: 101COA1104

Credits: 01 **Max. Marks: 50** **Hours: 30**

Learning Objectives

LO 1. To understand fundamental computational concepts underlying most programming languages

LO 2. To acquire working practices appropriate for a professional programmer and skills supporting the solution of small problems.

LO 3. To study Computing Science in independent way.

LO 4. To identify various types of computer parts.

LO 5. To work with different types of operating systems.

Course Outcomes:

After completion of the course, students will be able to-

CO 1. Efficiently handle conversation logic of number system

CO 2. Detect and identify the booting procedure of DoS

CO 3. Work with Input and Output devices

CO 4. Create Files and Folders and arrange them

CO 5. Efficiently handle shortcut keys for cut, copy, paste and other windows application keys

Practical No.	Unit
1	Study of BOOTING Procedure of O.S
2	Study of classification of computer
3	Study of Input Devices
4	Study of Output Devices
5	Study of MS-DOS Internal Commands
6	Study of MS-DOS External Commands
7	Study of Directory related Commands
8	Identification and study of Storage Devices
9	Study of windows O.S. i) Desktop

	ii) Control Panel iii) Icon iv) Taskbar
10	Moving, Coping file, and folder from one location to another under DOS and Windows
11	Installing Printers, and other hardware devices
12	Case study of Windows and Linux O.S

N.B.: Any Ten Practical from above.

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Department of Information Technology

Course Type: VSC-I

Course Title: Digital Logic

Course Code: 101COA1501

Credits: 02 **Max. Marks: 50** **Lectures: 30 Hrs.**

Learning Objectives:

LO 1. To describe the various concepts of digital electronics

LO 2. To understand working of basic and universal gates,

LO 3. To understand different number systems and conversion between them

LO 4. To understand the working Boolean algebra and multiplexer

LO 5. To understand the working of flipflop

LO 6. To identify basic structure of Microprocessor

Course Outcomes:

After completion of course the student will be able to-

CO 1. Convert different type of number systems which are used in digital communication and computer systems

CO 2. Identify different types of logic families which are the basic unit of different types of logic gates

CO 3. Identify and describe introduction to digital concepts

CO 4. Apply the logic in different programming logic building

CO 5. Identify microprocessor and components of it.

Unit No.	Title of Unit & Contents	Hrs.
I	**Number System**	**06**
	1. Number system: Binary number system, decimal number system, octal number system, hexadecimal number system. 2. Bases inter conversions 3. Binary Subtraction using 1'2 and 2's complement method	
	Unit Outcomes: UO 1. Efficiently handle conversion of number from one system to another UO 2. Handle 1's and 2's complement	
II	**Basic and Universal Gate**	**11**

	1. Boolean algebra: Fundamental concepts of Boolean algebra, Symbol, Boolean equation 2. Basic Gates: Truth tables of different types of gate NOT gate, AND gate, OR gate, NAND gate, NOR gate, X-OR gate, X-NOR gate, 3. Basic laws of Boolean algebra and simplification of Boolean 4. Universal property of NAND and NOR gate	
	Unit Outcomes: UO 1. Identify the basic building block gates UO 2. Work with Boolean algebra	
III	**Adder, Mux and De-Mux**	**07**
	1. **Combinational logic circuit:** Half adder and FULL adder, parallel binary adders, HALF subtractor and FULL subtractor 2. **Mux and Demux:** Multiplexer and demultiplexer with types & examples, Encoder and decoder with types	
	Unit Outcome: UO 1. Able to work with half adder, subtractor and encoder	
IV`	**Study of Flip flop**	**06**
	1. **Sequential logic circuit:** Flip-flop-latches, edge triggered and level triggered 2. **Flip flop with types:** SR flip flop, D flip flop, JK flip flip and T flip-flop 3. **Introduction to Microprocessors:** Basic components of microprocessors.	
	Unit Outcomes: UO 1. Efficiently handle sequential logic circuit UO 2. Identify the components of microprocessors	
V	**Practicals (Included in above 04 units)**	
	1. To perform and verify the truth tables of basic gates 2. To perform and verify the truth tables of derived gates 3. To perform and verify the truth tables of EX-OR and EX-NOR gate 4. Verify the universal property of NAND gate and NOR gate 5. Implement and verify the truth table of any two Boolean equation 6. Verify the truth table of half adder and Full adder 7. To perform and verify the truth table of multiplexer 8. Microprocessor block diagram and identification	

Learning Resources:

1. Digital Computer Fundamentals, Floyd, Thomas L, 3 rd Edition 1997.
2. Digital Computer Fundamentals, Malvino, Pual Albert and Leach, Donald P, 3rd Edition, 1995. TMH.
3. Modern Digital Electronics, R. P. Jain, 3rd Edition, Tata Mc Graw Hill, 2003.
4. Computer Organization and Architecture, William Stallings, Pearson Education 2003
5. Computer systems design and architecture, Heuring and Jordan , Pearson Education
6. Digital Computer Fundamentals, Bartee, Thomas C, 6 th Edition, 1995, TMH
7. Digital Electronics, Bignell and Donovan, 5th Edition, Thomson Publication, 2007

Semester - II

Shiv Chhatrapati Shikshan Sanstha's

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Department of Information Technology

Course Type: DSC -III

Course Title: Object Oriented Programming Through C++

Course Code: 101COA2105

Credits: 03 **Max. Marks: 75** **Hours: 45**

Learning Objectives:

LO 1. To describe the object-oriented programming approach in connection with C++

LO 2. To understand Object oriented concepts like data abstraction, encapsulation, etc.

LO 3. To understand concepts like inheritance, virtual function

LO 4. To understand the difference between the top-down and bottom-up approach

LO 5. To solve the real-world scenarios using top-down approach

Course Outcomes:

After completion of the course, students will be able to-

CO 1. Identify importance of object-oriented programming and difference between structured oriented and object-oriented programming features

CO 2. Solve computational problems using basic constructs, functions.

CO 3. Make use of objects and classes for developing programs.

CO 4. Implement relationships between classes.

CO 5. Use various object-oriented concepts to solve different problems.

Unit No.	Title of Unit & Contents	Hrs.
I	**Basics of OOPs and C++**	**12**
	1. **Introduction:** Object Oriented Paradigm 2. **Basic concepts of OOP:** Object, Class, Data Abstraction, Encapsulation, Inheritance, Polymorphism, Overloading, Dynamic binding, Message Passing. 3. **C++ Features:** The iostream class, C++ comments, C++ keywords, variable declaration, 4. **Manipulators:** endl, setw, setprecision, Scope resolution operator, new and delete operators. 5. **Functions:** function declaration, calling the function, function definition, passing argument to, returning value from function, pass by value, pass by	

Unit No.	Title of Unit & Contents	Hrs.
	reference, default arguments, overloaded functions, inline functions	
	Unit Outcomes: UO 1. Understand basic concepts of OOPs UO 2. Abel to write logic using functions	
II	**Classes and Object**	**13**
	1. **Classes & objects:** class declaration, class members, 2. **Class member visibility:** private, public, protected. 3. **Constructor and destructor:** Default constructor, constructor with argument, constructor with default arguments, copy constructor, 4. **Member Function:** Defined outside the class, objects as arguments, returning objects from functions, manipulating private data members, Array of objects	
	Unit Outcome: UO 1. Implement concept of Class and object UO 2. Understand implementation of constructors, members functions	
III	**Overloading and Type Conversion**	**08**
	1. **Operator Overloading:** Defining operator overloading, overloading unary operator, overloading binary operator 2. **Data conversion:** conversion between basic to class types, conversion between objects and basic types	
	Unit Outcomes: UO 1. Define new meaning to operators using overloading	
IV	**Inheritance and Virtual Function**	**12**
	1. **Inheritance:** Derived class & Base class: Specifying the derived class, accessing the base class members, derived class constructor, overriding member functions, public & private inheritance. 2. **Level of inheritance:** Simple / Single inheritance, Multilevel inheritance, multiple inheritance, hybrid inheritance, Hierarchical inheritance, Hybrid Inheritance, constructors in inheritance. 3. **Virtual Functions**: Introduction, Normal member function accessed with pointers, virtual member function accessed with pointers, this pointer	
	Unit Outcomes: UO 1. Implement various concepts of inheritance to solve real life problems. UO 2. Understand use of virtual functions	

Learning Resources

1. Object Oriented Programming with C++, E. Balagurusami, Fourth Edition, Tata Mc-Graw Hill
2. Complete Reference C++, Herbert Schildt, Tata McGraw Hill
3. Object Oriented Programming in Turbo C++, Robert Lafore, Fourth Edition Galgotia Publications.
4. The C++ Programming Language, Bjarne Stroustrup, Third Edition, Addison-Wesley Publishing Company
5. The C++ Programming Language (4th Edition), Bjarne Stroustrup
6. C++ Primer', Stanley B. Lippman, Josée Lajoie, and Barbara E. Moo
7. https://notalentgeek.github.io/note/note/project/project-independent/pi-brp-beginning-c-programming/document/20170807-1504-cet-1-book-and-source-1.pdf
8. https://www.w3schools.com/cpp/cpp_intro.asp
9. https://www.javatpoint.com/cpp-tutorial

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Department of Information Technology

Course Type: DSC-III

Course Title: Lab Course (Object Oriented Programming Through C++)

Course Code: 101COA2107

Credits: 01 **Max. Marks: 50** **Hours:15**

Learning Objectives:

LO 1. To describe the object-oriented programming approach in connection with C++

LO 2. To understand Object oriented concepts like data abstraction, encapsulation, inheritance, virtual function, etc.

LO 3. To understand the difference between the top-down and bottom-up approach

LO 4. To solve the real-world scenarios using top-down approach

Course Outcomes:

CO 1. Solve computational problems using basic constructs like if-else, control structures, array.

CO 2. Identify importance of object-oriented programming and difference between structured oriented and object-oriented programming features.

CO 3. Make use of objects and classes for developing programs.

CO 4. Use various object-oriented concepts to solve different problems

Practical No.	Unit
1	Program to demonstrate I/O statements and manipulators
2	Program for scope resolution operator
3	Write a program using area() function that returns the area of a circle with given radius. float area(float r)
4	Write a program using min() function that returns the smallest of two integers int min(int x, int y)
5	Program to demonstrate simple concept of class and object concept
6	Program to demonstrate visibility modes used in class
7	Program to demonstrate constructor and its types
8	Program to demonstrate destructor
9	Program to find area and circumference of rectangle and triangle using function overloading
10	Program to demonstrate operator overloading concept
11	Program to demonstrate concept of single inheritance
12	Program to demonstrate concept of multiple inheritance
13	Program to demonstrate virtual function

N.B.: Any Ten Practical from above.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Department of Information Technology

Course Type: DSC -IV

Course Title: Internet Programming

Course Code: 101COA2106

Credits: 03 **Max. Marks: 75** **Hours: 45**

Learning Objectives:

LO 1. To get knowledge about Web site and web page

LO 2. To understand HTML programs with basic formatting tags

LO 3. To work on table, frame and form creation

LO 4. To understand linking with pages

LO 5. To make use of formatting scripting like CSS

Course Outcomes:

After completion of course the student will be able to-

CO 1. Define and apply the standards used for web page design

CO 2. Design webpage using the elements of HTML.

CO 3. Create Webform for accepting user inputs.

CO 4. Build dynamic webpages using techniques with CSS.

CO 5. Use Client side scripting language for formatting webpages.

Unit No.	Title of Unit & Contents	Hrs.
I	**Basics of Web Design**	**6**
	1. Basics in Web Design, Brief History of Internet, What is World Wide Web, Why create a web site, Web Standards, Five Golden rules of web designing **2.** Basic structure of HTML Programme and Tags	
	Unit Outcomes: UO 1. Understand History of Internet UO 2. Understand Structure of HTML programme	
II	**Introduction to HTML and Tags**	**13**
	1. HTML Markup tags: Tags-Definition, Basic Tags-HTML, HEAD, TITLE, BODY. Paragraph Tags, List tags, Horizontal Rule Tag, Headings Tags, Block quote Tags, Address Tags, FONT Tag, PRE tag, DIV tags **2. Formatting Tag:** Text formatting tag, Para formatting, Alignments, etc. **3. Linking in HTML:** U.R.L. concept, Hyperlink (Anchor) Tag and it's all	

Unit No.	Title of Unit & Contents	Hrs.
	attributes, Creating Email Hyperlinks (using mailto anchor). 4. **Use of Images:** Introduction, Image & image formats, <img> tag and it's all attributes, Inline & Floating Images, Using Images as links.	
	Unit Outcome: UO 1. Develop HTML programs which uses HTML tags, formatting tags UO 2. Design web pages with hyperling and images	
III	**Table, Frame and Form**	**16**
	1. **Tables in HTML:** Introduction, Table Tags:- TABLE, TR, TH, TD and all Attributes, Row span, Cols pan, Cell spacing, Cell padding, Table examples 2. **Frames in HTML:** Overview, FRAMESET & FRAME tags and its attributes, Simple frame Examples, Use of tag, Frame targeting, Floating frames. 3. **Forms in HTML:** Introduction to forms, FORM tag and it's attributes (Action, Method, Name), Simple form examples, 4. **Form controls:** Text Field, Password Field, Multiline Text Area, DropDown List, Check Box, Radio Buttons, Scrolled List, Reset Button, Submit button.	
	Unit Outcomes: UO 1. Apply the concepts of tables and frame UO 2. Efficiently implement html form for user input	
IV	**Cascading Style Sheet**	**10**
	1. **Introduction:** Introduction to Cascading Style Sheets, Concept of CSS, Creating Style Sheet, CSS Properties 2. **Creating using styling:** CSS Styling(Background, Text Format, Controlling Fonts), Working with block elements and objects 3. **Creating Class and ID:** Working with Lists and Tables, CSS Id and Class, CSS Color 4. **Linking a Style Sheet to an HTML Document:** Inline style and External Style Sheet.	
	Unit Outcomes: UO 1. Abel to develop webpages which will make use CSS	

Learning Resources:

1. Web Publishing, Mnica D' Souza, Jude D' Souza,TMH Publication)
2. The complete reference HTML & CSS, T.A. Powell, TMH Publication
3. HTML, DHTML, JavaScript, Perl CGI, IVAN Bayroos, BPB Publication
4. HTML 5 Black Book, by Kogent Learning Solutions Inc, Dreamtech Press
5. Head First HTML 5 programming, Eric Freeman, O'Reilly
6. HTML5 Step by Step, Faithe Wempen, Microsoft Press
7. Internet and Web Technologies ,Raj Kamal, McGraw Hill
8. https://www.w3schools.com/html/
9. https://www.tutorialspoint.com/html/index.htm
10. https://www.javatpoint.com/html-tutorial
11. https://www.w3schools.com/css/
12. https://www.w3.org/Style/CSS/Overview.en.html

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Department of Information Technology

Course Type: Lab Course

Course Title: Lab Course –IV (Internet Programming)

Course Code: 101COA1104

Credits: 01 **Max. Marks: 50** **Hours: 30**

Learning Objectives:

LO 1. To get knowledge about Web site and web page

LO 2. To understand HTML programs with basic formatting tags

LO 3. To work on table, frame and form creation

LO 4. To understand linking with pages

LO 5. To make use of formatting scripting like CSS

Course Outcomes:

After completion of course the student will be able to-

CO 1. Define and apply the standards used for web page design

CO 2. Design webpage using the elements of HTML.

CO 3. Create Webform for accepting user inputs.

CO 4. Build dynamic webpages using techniques with CSS.

CO 5. Use Client side scripting language for formatting webpages.

Practical No.	Unit
1	Develop and demonstrate a HTML document that illustrate i) Headings tags(H1,H2,H3,H4,H5,H6) ii) Font Details (Font Size, Style, Type, Color)
2	Develop and demonstrate a HTML document that illustrate <font> tag with all attributes
3	Develop and demonstrate a HTML document that illustrates ordered list and unordered list
4	Design an web page that make use of formatting tags.
5	Create a page to show different character formatting (B, I, U, SUB, SUP) tags. viz : $\log_b m^p = p \log_b m$
6	Design an HTML page to make use of following

	i) Image as a background ii) Hyperlink using an image iii) Hyperlink with another web page(A, Base, Href)
7	Develop an HTML page that illustrates i) Table Alignment (Cell Spacing, Cell Padding ,Height ,Width, Border, Rowspan , colspan) ii) Setting Different Table Attributes(Color, Image)
8	Create a Web page having Main Frame along with three Sub Frames(Windows)
9	Create "Website Login Form" which consists of following details User Name , Password Address, Ph no, Sex, Hobbies, Date Of Birth ,Country , along with submit and Reset Button
10	Create a login form as above which will use the post method by sending data on another form.
11	Create a CSS document on Internal style sheet
12	Create a CSS document on External style sheet
13	Create a CSS document on In line style sheet

N.B.: Any Ten Practical from above.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Department of Information Technology

Course Type: VSC-II

Course Title: Basics of Statistics in Computer Application

Course Code: 101COA2502

Credits: 02 **Max. Marks: 50** **Hours: 30**

Learning Objectives:

LO 1. To acquire a strong foundation in statistical analytics

LO 2. To cultivate statistical thinking

LO 3. To apply the fundamental principles, concepts and methods of statistics

LO 4. To classify, tabulate and represent the data graphically

Course Outcomes:

After completion of course the student will be able to-

CO 1. Explain descriptive statistics

CO 2. Analyze data and apply measures of central tendency on data

CO 3. Apply fundamental techniques of data representation on data

CO 4. Apply knowledge of statistics in career fields like Data Science

Unit No.	Title of Unit & Contents	Hrs.
I	**Statistics and Graphical Representation**	**12**
	1. Introduction: Definitions of Statistics, Importance of statistics, Collection of Data, Types of Data, Attributes and variables, Construction of Frequency, Cumulative Frequency Distribution **2. Graphical representation of frequency distribution:** Histogram, Frequency Polygon, Frequency Curve and Cumulative Frequency curves (Ogive curves), Diagrammatic representations: Simple bar, Subdivided bar, Pie diagrams	
	Unit Outcomes: UO 1. To acquire a strong foundation in statistical analytics by applying techniques of data representation	
II	**Measures of Central Tendency**	**10**
	1. Concept of central tendency	

Unit No.	Title of Unit & Contents	Hrs.
	2. Arithmetic Mean: Definition, Formulae and computation for ungrouped and grouped, data, Merits and Demerits **3. Median:** Definition, Formulae and Computation for ungrouped and grouped data, Merits and Demerits **4. Mode:** Definition, Formulae and Computation for ungrouped and grouped data, Merits and Demerits	
	Unit Outcome: UO 1. Compute and interpret various measures of central tendency such as mean, median, mode etc.	
III	**Measures of Dispersion**	**8**
	1. Concept of Dispersion **2. Range:** Definition, Formulae and Computation for ungrouped and grouped data **3. Standard Deviation:** Definition, Formulae and Computation for ungrouped and grouped data **4. Variance:** Definition, Formulae and Computation for ungrouped and grouped data	
	Unit Outcomes: UO 1. To compute and interpret various measures of dispersion	
IV	**Practicals (Included in above 03 units)**	
	1. Study of histogram: Construct histogram for given statistical data using MS-Excel 2. Construct frequency polygon for given data using MS-Excel 3. Draw frequency curve for given data using MS-Excel 4. Draw and construct ogive for given statistical data using MS-Excel 5. Construct simple bar diagram for given data using MS-Excel 6. Draw subdivided bar diagram for given data using MS-Excel 7. Draw pie diagram for given statistical data using MS-Excel 8. Calculate various measures of central tendency (mean, median, mode) on given data using MS-Excel 9. Calculate various measures of dispersion.	

Learning Resources:

1. Statistical Methods by S.P. Gupta, Sultan Chand and Sons, 2021
2. Fundamentals of Statistics by A.M. Gun, M. K. Gupta and B. Dasgupta, World Press, 2016

3. Modern Elementary Statistics by J.E. Freund, Pearson Education, 2000
4. Fundamentals of Mathematical Statistics by S C. Gupta & V.K. Kapoor, Sultan Chand & Sons, 2000
5. Elements of Statistics 1: Descriptive Statistics And Probability / 1st, Edition, Stephen Bernstein, Ruth Bernstein, McGraw Hill, 2020
6. Business Mathematics and Statistics by R K Ghosh & S Saha, New Central Book Agency (p). Ltd, 2016
7. Fundamentals of Applied Statistics, S.C. Gupta, Sultan Chand and Sons, 2014
8. Probability and statistics with reliability queuing and computer science applications by K. S. Trivedi, Wiley, 2016
9. The Art of Statistics: Learning from Data, David Spiegelhalte, Pelican Book, 2020
10. Practical Statistics for Data Scientists: 50+ Essential Concepts Using R and Python, Second Edition, Peter Bruce, Andrew Bruce, Peter Gedeck, Oreilly, 2020

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

UG First Year

Basket I: Generic/Open Elective (GE/OE)

(GEs offered to the Science & Technology students in Sem.-I and II)

Sr. No.	BoS Proposing GE/OE	Code	Course Title	Credits	Hrs.
1	Commerce	101AAF1401	Mutual Fund Management	04	60
2	Commerce	101MAE1401	Fundamentals of Statistics	04	60
3	English	101ENG1402	English for Science and Technology	04	60
4	Geography	101GEO1401	General Geography	04	60
5	Commerce	101BAI1401	Personal Financial Management	04	60
6	Marathi	101MAR1401	स्पर्धापरीक्षाआणिमराठीभाषा	04	60
7	Political Science	101POL1401	Human Rights	04	60
8	Biotechnology	101BIO1401	Nutrition, Health and Hygiene	04	60
9	Music	101MUS1401	Indian Vocal Classical & Light Music	04	60
10	NCC Studies	101NCC1401	Introduction to NCC	04	60
11	Sports	101SPO1401	Counseling and Psychotherapy	04	60

Note: Student can choose any one GE from the basket.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

UG First Year

Basket II: Skill Enhancement Courses (SEC)

(SEC offered to the Science & Technology students in Sem.-I and II)

Sr. No.	BoS Proposing SEC	Code	Course Title	Credits	Hrs.
1	Chemistry	101CHE1601	Pesticides and Green Chemistry	02	30-45
2	Information Technology	101COM1601	Basics of Python Programming	02	30-45
3	Physics	101PHY1601	Physics Workshop Skills	02	30-45
4	Biotechnology	101BIO1601	Food Processing Technology	02	30-45
5	Botany	101BOT1601	Mushroom Cultivation Technology	02	30-45
6	English	101ENG1601	Proof Reading and Editing	02	30
7	Information Technology	101COA1601	PC Assemble and Installation	02	30-45
8	Marathi	101MAR1601	कथा/पटकथालेखन	02	30
9	Zoology	101ZOO1601	Bee Keeping	02	30-45

Note: Student can choose any one SEC from the basket.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

UG First Year

Basket III: Ability Enhancement Courses (AEC)

(AEC offered to the Science & Technology students in Sem.-I)

Sr. No.	BoS Proposing AEC	Code	Course Title	Credits	Hrs.
1	English	101ENG1701	English for Professionals-I	02	30
2	English	101ENG1701	English for Professionals-II	02	30

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Extra Credit Activities

Sr. No.	Course Title	Credits	Hours T/P
1	MOOCs	Min. of 02 credits	Min. of 30 Hrs.
2	Certificate Courses	Min. of 02 credits	Min. of 30 Hrs.
3	IIT Spoken English Courses	Min. of 02 credits	Min. of 30 Hrs.

Guidelines:

Extra -academic activities

1. All extra credits claimed under this heading will require sufficient academic input/ contribution from the students concerned.
2. Maximum 04 extra credits in each academic year will be allotted.
3. These extra academic activity credits will not be considered for calculation of SGPA/CGPA but will be indicated on the grade card.

Additional Credits for Online Courses:

1. Courses only from SWAYAM and NPTEL platform are eligible for claiming credits.
2. Students should get the consent from the concerned subject Teacher/Mentor/Vice Principal and Principal prior to starting of the course.
3. Students who complete such online courses for additional credits will be examined/verified by the concerned mentor/internal faculty member before awarding credits.
4. Credit allotted to the course by SWAYAM and NPTEL platform will be considered as it is.

Additional Credits for Other Academic Activities:

1. One credit for presentation and publication of paper in International/National/State level seminars/workshops.
2. One credit for measurable research work undertaken and field trips amounting to 30 hours of recorded work.
3. One credit for creating models in sponsored exhibitions/other exhibits, which are approved by the concerned department.
4. One credit for any voluntary social service/Nation building exercise which is in collaboration with the outreach center, equivalent to 30 hours
5. All these credits must be approved by the College Committee.

Additional Credits for Certificate Courses:

1. Students can get additional credits (number of credits will depend on the course duration) from certificate courses offered by the college.
2. The student must successfully complete the course. These credits must be approved by the Course Coordinators.
3. Students who undertake summer projects/ internships/ training in institutions of repute through a national selection process, will get 2 credits for each such activity. This must be done under the supervision of the concerned faculty/mentor.

Note:

1. The respective documents should be submitted within 10 days after completion of Semester End Examination.
2. No credits can be granted for organizing or for serving as office bearers/ volunteers for Inter-Class / Associations / Sports / Social Service activities.
3. The office bearers and volunteers may be given a letter of appreciation by the respective staff coordinators. Besides, no credits can be claimed for any services/ activities conducted or attended within the college.
4. All claims for the credits by the students should be made and approved by the mentor in the same academic year of completing the activity.
5. Any grievances of denial/rejection of credits should be addressed to Additional Credits Coordinator in the same academic year.
6. Students having a shortage of additional credits at the end of the third year can meet the Additional Credits Coordinator, who will provide the right advice on the activities that can help them earn credits required for graduation.

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

(Autonomous)

Examination Framework

Theory:

40% Continuous Assessment Tests (CATs) and 60% Semester End Examination (SEE)

Practical:

50% Continuous Assessment Tests (CATs) and 50% Semester End Examination (SEE)

Course	Marks	CAT & Mid Term Theory				CAT Practical		Best Scored CAT & Mid Term	SEE	Total
1	2	3				4		5	6	5 + 6
		Att.	CAT I	Mid Term	CAT II	Att.	CAT			
DSC/DSE/ GE/OE/Minor	100	10	10	20	10	-	-	40	60	100
DSC	75	05	10	15	10	-	-	30	45	75
Lab Course/AIPC/ OJT/FP	50	-	-	-	-	05	20	-	25	50
VSC/SEC/ AEC/VEC/CC	50	05	05	10	05	-	-	20	30	50

Note:

1. All Internal Exams are compulsory
2. Out of 02 CATs best score will be considered
3. Mid Term Exam will be conducted by the Exam Section
4. Mid Term Exam is of Objective nature (MCQ)
5. Semester End Exam is of descriptive in nature (Long & Short Answer)
6. CAT Practical (20 Marks): Lab Journal (Record Book) 10 Marks, Overall Performance 10 Marks.