

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution



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

Undergraduate Programme of Science and Technology

B.Sc. (Degree) in Computer Application

Board of Studies

in

B. Sc. Computer Application

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

[UG I Year]

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)

w.e.f. June, 2026

(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 2026-27**. It was found that, the structure is as per the NEP-2020 guidelines of Govt. of Maharashtra.

Date: 11/04/2026

Place: Latur

NEP CELL

Rajarshi Shahu Mahavidyalaya, Latur
Empowered Autonomous Institution



॥ आर्योह तमसो ज्योतिः॥

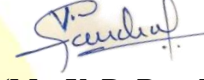
Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)

CERTIFICATE

I hereby certify that the documents attached are the Bonafide copies of the Curriculum of **B.Sc. (Degree) in Computer Application** to be effective from the **Academic Year 2026-27**.

Date: 06/04 /2026

Place: Latur



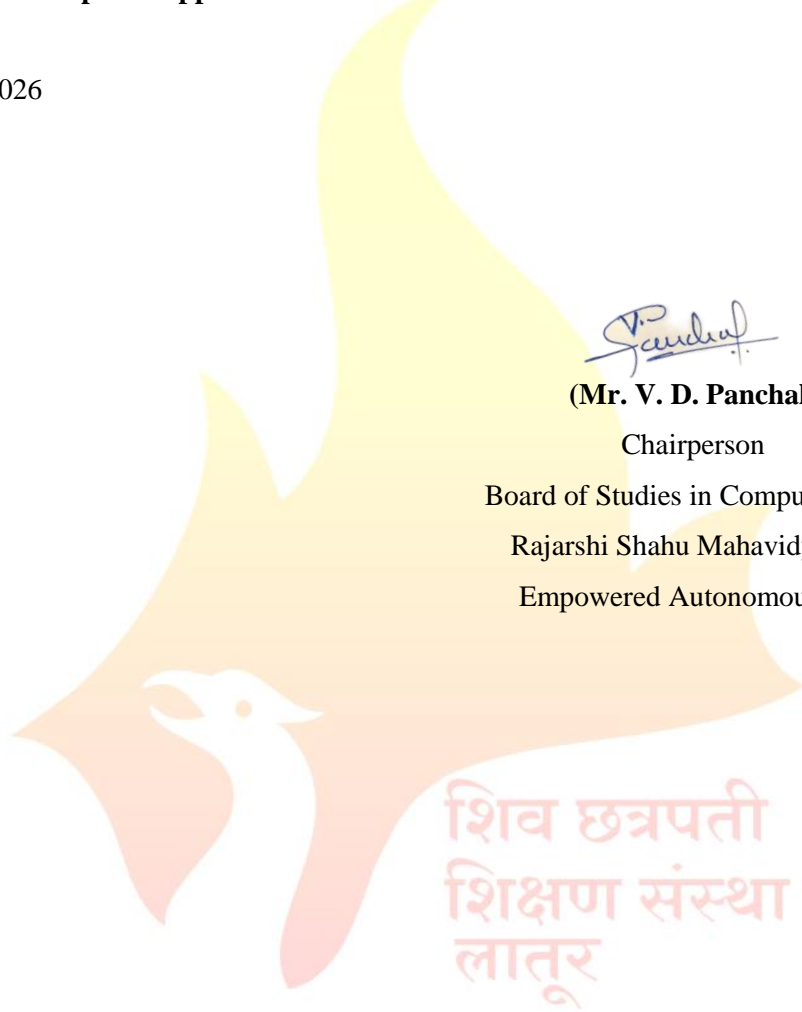
(Mr. V. D. Panchal)

Chairperson

Board of Studies in Computer Application

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution



शिव छत्रपती
शिक्षण संस्था
लातूर

॥ आर्योह तमसो ज्योतिः ॥

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)



Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution
Members of Board of Studies in Computer Science
Under the Faculty of Science and Technology

Sr. No.	Name	Designation	In position
1	Mr. V. D. Panchal Department of Information Technology, Rajarshi Shahu Mahavidyalaya, Latur (Autonomous)	Chairperson	HoD
2	Dr. B. G. Koshidgewar Associate Professor, Dhinda Maharaj College, Deglur	Member	V.C. Nominee
3	Dr. Ranjit Patil Principal, Dr. D. Y. Patil, A.C.S. College, Pimpri, Pune.	Member	Academic Council Nominee
4	Dr. Smita R. Bhanap Assistant Professor, Assistant Professor, Fergusson College (Autonomous), Pune	Member	Academic Council Nominee
5	Dr. B. G. Kodge Associate Professor, School of Science, GITAM University, Rudram, Hyderabad.	Member	Expert from outside for Special Course
6	Mr. Amol Kalekar Associate Technical Architecture, Sagitech Solutions Pvt. Ltd., Pune	Member	Expert from Industry
7	Mr. Vidyadhar Rajnale Project Manager, Cognizant Technology Solutions, Pune	Member	Alumni
8	Dr. Shivraj Patil Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Member	Faculty Member
9	Ms. Jayshri Jatal Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Member	Faculty Member
10	Mr. Mahadev Bhatade Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Member	Faculty Member
11	Mr. Abdul Shaikh Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Member	Faculty Member
12	Ms. Shraddha Pawar Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Member	Faculty Member
13	Mr. Bhairavnath Gorde Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Member	Faculty Member
14	Mr. Anant Panchal Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Member	Faculty Member
15	Ms. Pooja Bhosale Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Member	Faculty Member
16	Mr. Krushna Surwase Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Member	Faculty Member

From the Desk of the Chairperson...

It gives me immense pleasure and honor to present the revised syllabi for the First Year of B.Sc. C.A. under the framework of NEP-2020, to be implemented from the Academic Year 2026–27.

The syllabus has been precisely revised by incorporating constructive feedback from stakeholders, recent technological advancements, and the dynamic requirements of the global industry. The revision ensures a balanced integration of academic depth, practical exposure, and skill-oriented learning, in alignment with the vision and objectives of NEP-2020.

The Department of Information Technology remains committed to providing a supportive, inclusive, and intellectually enriching learning environment. Our vision is to evolve as a center of excellence in computer education by nurturing competent, innovative, and socially responsible graduates who can contribute effectively to national development and improve quality of life through technology.

The B.Sc. Computer Applications programme is carefully structured to equip students with strong foundational as well as advanced knowledge in computing. It emphasizes the development of problem-solving skills, analytical thinking, and exposure to emerging trends in computer applications and information technology, thereby preparing students to meet global standards and challenges.

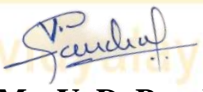
I take this opportunity to express my sincere gratitude to our esteemed Principal, Dr. Mahadev Gavhane, for his continuous support and encouragement. I extend my special thanks to Prof. Sadashiv Shinde, Vice Principal and Dr. Anuja Jadhav, Nodal Officer, NEP-Cell, Rajarshi Shahu Mahavidyalaya, Latur, for their valuable guidance and direction during the process of revising the syllabus under NEP-2020.

I also extend my heartfelt appreciation to all the respected members of the Board of Studies for their valuable suggestions, insightful inputs, and dedicated efforts in shaping the revised curriculum.

Finally, I sincerely thank all the faculty members and contributors who were involved in the process of syllabus revision and development.

॥ आरोग्यं तमसो ज्योतिः ॥

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)


(Mr. V. D. Panchal)
Chairperson

Board of Studies in Computer Application



Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

Index

Sr. No.	Content	Page No.
1	Structure for Four Year Multidisciplinary UG Programme	1
2	Abbreviations	2
3	Courses and Credits	3
4	UG Program Outcomes	4
5	UG Programme Specific Outcomes	5
6	Curriculum: Semester-I	6
	DSC I : Problem Solving through C	7
	DSC II : Computer Fundamentals and Applications	12
	VSC I : Basics of Digital Electronics and Logic Design	17
7	Curriculum: Semester-II	20
	DSC III : Object Oriented Programming through C++	21
	DSC IV : Internet Programming	26
	VSC II : Basics of Statistics in Computer Application	31
8	Basket I: Open Elective (OE)	-
9	Basket II: Skill Enhancement Courses (SEC)	-
10	Basket III: Ability Enhancement Courses (AEC)	-
11	Extra Credit Activities	34
12	Examination Framework	36

॥ आर्योह तमसो ज्योतिः॥

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)



Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

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=0 8	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 Course
7. SEC : Skill Enhancement Course
8. AEC : Ability Enhancement Course
9. MIL : Modern Indian Languages
10. IKS : Indian Knowledge System
11. FSRCE : Fostering Social Responsibility & Community Engagement
12. VEC : Value Education Course
13. OJT : On Job Training
14. FP : Field Project
15. CEP : Community Engagement Programme
16. CC : Co-Curricular Course
17. RP : Research Project/Dissertation
18. SES : Shahu Extension Services

शिव छत्रपती
शिक्षण संस्था
लातूर

॥ आरोह तमसो ज्योतिः॥

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)



Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution
Faculty of Science and 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)	Computer Fundamentals and Applications	03	45	
		101COA1104	Lab Course-II	01	30	
		OE-I	From Basket	04	60	
		101COA1501 (VSC-I)	Basics of Digital Electronics and Logic Design	02	30	
		(SEC-I)	Basics of Python	02	30	
		101ENG1701 (AEC-I)	English for Professionals – I	02	30	
		(VEC-I)	Constitution of India	02	30	
		AIPC/OJT-I	Mini Project – I	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	
		OE-II	From Basket	04	60	
		101COA2502 (VSC-II)	Applied Statistics for Data Analysis	02	30	
		(SEC-II)	DBMS	02	30	
		(AEC-II)	English for Professionals – II	02	30	
		CC	CC – I	02	30	
		Generic IKS	Introduction to Indian Knowledge System	02	30	
		Total Credits				22
Total Credits (Semester I & II)				44		



Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

Name of the Programme : B.Sc. (Computer Application)

Programme Outcomes (POs) for B.Sc. (Computer Application)	
PO 1	Core Knowledge and Problem Solving: Apply fundamental knowledge of computing and use logical and computational thinking.
PO 2	Design and Development: Design, develop, test, and implement software solutions using appropriate tools and techniques.
PO 3	Modern Tools and Technologies: Utilize contemporary technologies, platforms, and tools for real-world applications.
PO 4	Data and Software Practices: Apply data handling techniques, software engineering practices for reliable systems.
PO 5	Ethics, Society and Environment: Evaluate ethical, legal, environmental, and societal impacts of computing solutions.
PO 6	Communication and Teamwork: Communicate effectively and collaborate in multidisciplinary teams.
PO 7	Lifelong Learning and Employability: Engage in continuous learning, innovation, entrepreneurship and career development.
PO 8	Research and Innovation: Apply research-based approaches, critical thinking, and analytical skills to investigate complex computing problems, explore innovative solutions, and contribute to technological advancement.



Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

Name of the Programme : B.Sc. (Computer Application)

Programme Specific Outcomes (PSOs) for B.Sc. (Computer Application)	
PSO No.	After completion of this programme the students will be able to -
PSO 1	Developing business-oriented software applications using appropriate programming tools and technologies to address real-world requirements.
PSO 2	Designing and deploying web and enterprise applications using modern frameworks and development practices.
PSO 3	Managing databases and information systems to support efficient data storage, retrieval, and decision-making processes.
PSO 4	Applying software engineering principles along with understanding IT infrastructure and implementing basic security measures for system development and maintenance.
PSO 5	Analyzing business data to generate meaningful insights and utilizing emerging technologies such as AI, ML, and Data Science for innovative solutions.
PSO 6	Demonstrating professional ethics, teamwork, communication skills, and entrepreneurial abilities in diverse computing environments.

॥ आरोह तमसो ज्योतिः ॥

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)



Semester - I

शिव छत्रपती
शिक्षण संस्था
लातूर

॥ आर्योह तमसो ज्योतिः॥

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)



**Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur**

Empowered Autonomous Institution
Faculty of Science and Technology
Department of Information Technology
UG I Sem-I

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. Design algorithms and flowcharts to solve computational problems
- LO 2. Develop C programs using branching, looping constructs, and arithmetic, logical, and relational operators.
- LO 3. Utilize arrays, structures, and unions for efficient data storage and manipulation.
- LO 4. Apply modular programming concepts using functions and pointers in C.

Course Outcomes:

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

- CO 1. Analyze computational problems and design appropriate algorithms and flowcharts for their solutions.
- CO 2. Develop and implement efficient C programs using control structures and operators.
- CO 3. Design structured C programs using arrays, structures, and unions for data handling.
- CO 4. Apply modular programming techniques using functions and pointers to develop complete C applications.

Unit No.	Title of Unit & Contents	Hrs.
I	Basics of C Language	08
	<ul style="list-style-type: none">1. Overview of C: Introduction to Flowchart and algorithm, Importance and features of C, Basic structure of C programming, Compilation and execution process2. Data Types in C: C tokens, Keywords, Identifiers, Constants, Variables, Data types, Declaration of variables, Assigning values to variables, Defining symbolic constants, Simple Programs3. Input and Output statements: Input and Output statements, Reading character, Writing character, formatted input, formatted output statements.4. Debugging techniques : Compilation errors, runtime errors	
	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
	<ul style="list-style-type: none">1. Operators and Expressions: Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment and Decrement operators, Conditional operators, Bitwise operators,	

Unit No.	Title of Unit & Contents	Hrs.
	<p>Special operators, Type Conversion in expressions, Operator precedence</p> <p>2. Library Functions: Mathematical functions</p> <p>3. Branching and Looping: Simple 'if' statement, Nested, Ladder 'if-else' statement. The 'Switch' statement, break, continue, goto, exit statement, 'While' statement, 'do-while' statement, 'for' statement</p> <p>Unit Outcomes: UO 1. Develop C programs which uses Arithmetic, Logical, Relational operators UO 2. Design and develop programmes with branching and looping statements</p>	
III	Arrays and String Handling	10
	<p>1. Arrays: Introduction, One dimensional, Two dimensional and Multidimensional arrays, Initialization of arrays,</p> <p>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,</p> <p>3. String handling functions: String functions & string.h file.</p> <p>Unit Outcomes: UO 1. Apply the concepts of arrays to implement concepts of data structure UO 2. Efficiently implement string functions during the application</p>	
IV	Pointers, Structure and Functions	12
	<p>1. Pointers: Understanding Pointers, Accessing the address of variables, Declaring and initializing pointers, Accessing a variable through its pointers.</p> <p>2. Structure and Union: Introduction, Defining Structure, declaring structure variables and structure members, arrays as structure, arrays within structure, union</p> <p>3. Functions: Definition of function. Return values and their types, Function calls, Function declaration, Categories of function, Nesting of function, Recursion, Command line argument.</p> <p>Unit Outcomes: UO 1. Able to develop applications which will make use of pointers for array UO 2. Develop programme / application by using functions, structures etc</p>	

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 & Ritchie, 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>

Internal Examination Pattern :

CAT – I: Assignment Based / Programming Assignment / Surprise Test

CAT – II: Google Form Online Test / Seminar

Mapping of POs, PSOs and COs:

	PO								PSO					
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	1	1	2	0	0	1	2	1	0	1	0	0
CO2	3	3	3	2	2	0	1	0	3	2	0	2	0	1
CO3	2	3	3	2	3	0	0	0	3	2	2	2	0	0
CO4	3	3	3	2	2	0	1	1	3	2	1	3	0	1

Scale : 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation.

शिव छत्रपती
शिक्षण संस्था
लातूर

॥ आरोह तमसो ज्योतिः॥

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)



**Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur**

Empowered Autonomous Institution
Faculty of Science and Technology
Department of Information Technology
UG I Sem-I

Course Type : Lab Course

Course Title : Lab Course –I (Based on DSC-I)

Course Code : 101COA1103

Credits : 01

Max. Marks: 50

Lectures: 30 Hrs

Learning Objectives:

- LO 1. Understand fundamental concepts and techniques of C programming.
- LO 2. Develop C programs using input-output, control, and iterative statements.
- LO 3. Apply programming constructs such as arrays, functions, structures, and unions.
- LO 4. Enhance logical thinking and problem-solving skills through program development and execution.

Course Outcomes:

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

- CO 1. Explain basic concepts of C and implement algorithms using C programming.
- CO 2. Demonstrate the use of input-output, control, and iterative statements in program development.
- CO 3. Apply arrays, structures, unions, and functions to develop C programs.
- CO 4. Analyze problems and develop logical, structured C programs for effective solutions.

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's from above.

Mapping of POs, PSOs and COs:

	PO								PSO					
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	2	2	1	0	1	2	3	1	1	2	1	0
CO2	3	3	2	2	1	0	1	1	3	1	1	2	1	0
CO3	3	3	3	3	1	0	1	2	3	2	2	3	1	1
CO4	3	3	2	2	1	0	1	3	3	2	1	3	1	0

Scale : 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation.

॥ आरोग्यं तमसो ज्योतिः ॥

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)



**Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur**

Empowered Autonomous Institution
Faculty of Science and Technology
Department of Information Technology
UG I Sem-I

Course Type : DSC-II

Course Title : Computer Fundamentals and Applications

Course Code : 101COA1102

Credits : 03

Max. Marks: 75

Lectures: 45 Hrs.

Learning Objectives

- LO 1. Describe the basic structure of a computer, including ALU, CPU, memory, and I/O devices, and explain the different generations and classifications of computers.
- LO 2. Convert numbers between decimal, binary, octal, and hexadecimal systems, and encode data using ASCII, EBCDIC, and BCD codes.
- LO 3. Compare and contrast various input/output devices and memory types, analyzing their suitability for specific tasks.
- LO 4. Perform basic operations in DOS, Windows, and Linux environments, and create simple documents, spreadsheets, and presentations using office applications.

Course Outcomes

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

- CO 1. Understand the fundamental concepts of computer systems, their architecture, and classifications.
- CO 2. Comprehend data representation, coding schemes, and number systems used in computers.
- CO 3. Identify and differentiate various input/output devices and memory/storage components.
- CO 4. Gain knowledge of computer software, operating systems, and their functions.

Unit No.	Title of Unit & Contents	Hrs.
I	Computer System & Data Representation	12
	1. Introduction to Computer System: Basic structure, ALU memory, CPU, I/O devices 2. Generations of computer 3. Classification of computers: Note book computers, personal computers, workstation, micro, mini ,mainframe, Supercomputer 4. Data Representation: Bit, Byte, Word ASCII, EBCDIC, BCD code, Introduction to number system: Decimal, Binary, Octal, Hexadecimal Unit Outcomes: UO 1. Define the basic components and functions of a computer system UO 2. Convert the numbers between decimal, binary, octal, and hexadecimal systems UO 3. Analyze type of computer used in various work places.	
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,	

Unit No.	Title of Unit & Contents	Hrs.
	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 different input and output devices used in a computer system. UO 2. Identify and Explain different types and storage devices	
III	Computer Software & Introduction to Operating System	10
	1. Computer Software 1.1. Definition of software 1.2. Types of software 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. Demonstrate the creation and management of files and directories in an operating system. UO 2. Assess the suitability of different software types and operating systems for specific tasks.	
IV	Study of Systems and Application Software	11
	1. Introduction to DOS, File and directory structure under DOS 2. Introduction to Windows O.S., Tools under Windows OS 3. Introduction to LINUX O.S., File and directory structure, Basic commands (Creating files and directory, Listing files and directories, understanding permissions) 4. Office Applications 4.1 Word Processor Application 4.2 Spread Sheet Solution Application 4.3 Presentation Application Unit Outcomes: UO 1. Explain the file and directory structure under DOS and the functions of Windows and Linux OS. UO 2. Assess the suitability of different operating systems for specific computing tasks.	

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 Niranjana 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
9. <https://www.geeksforgeeks.org/computer-science-fundamentals/computer-fundamentals-tutorial/>
10. https://www.tutorialspoint.com/computer_fundamentals/index.htm

Internal Examination Pattern:

CAT – I: Assignment Based / Surprise Test

CAT – II: Google Form Online Test / Seminar

Mapping of POs, PSOs and COs:

	PO								PSO					
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	1	1	1	1	0	1	1	1	1	1	1	0	1
CO2	3	1	1	2	1	0	1	1	1	0	2	1	1	0
CO3	3	1	2	2	1	0	1	1	1	1	2	1	0	0
CO4	3	1	2	2	1	1	1	1	1	2	1	1	2	1

Scale : 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation.

॥ आरोह तमसो ज्योतिः॥

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)



**Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur**

Empowered Autonomous Institution
Faculty of Science and Technology
Department of Information Technology
UG I Sem-I

Course Type : Lab Course

Course Title : Lab Course –II (Based on DSC-II)

Course Code : 101COA1104

Credits : 01

Max. Marks: 50

Lectures: 30 Hrs

Learning Objectives

- LO 1. Explain the booting procedure of an operating system and differentiate between cold and warm booting.
- LO 2. Identify and classify types of computers (micro, mini, mainframe, supercomputer, personal, notebook) and their usage.
- LO 3. Recognize and describe input devices (keyboard, mouse, scanner, voice recognition) and output devices (monitor, printer, and plotter).
- LO 4. Identify and study storage devices such as HDD, FDD, CD-ROM, and tape drives.

Course Outcomes:

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

- CO 1. Understand and perform booting procedures and basic operations of operating systems such as DOS, Windows, and Linux.
- CO 2. Identify, classify, and use different types of computers, input/output devices, and storage devices.
- CO 3. Apply DOS commands for file and directory management and manage files, folders, and hardware resources in Windows OS.
- CO 4. Compare and analyze features of Windows and Linux operating systems for effective usage.

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. Components 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
13	Study of Linux OS basic commands.

N.B.: Any ten practical from above.

Mapping of POs, PSOs and COs:

	PO								PSO					
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	1	1	1	1	0	1	1	1	1	1	1	0	1
CO2	3	1	1	2	1	0	1	1	1	0	2	1	1	0
CO3	3	1	2	2	1	0	1	1	1	1	2	1	0	0
CO4	3	1	2	2	1	1	1	1	2	1	1	2	1	1

Scale : 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation.

शिव छत्रपती
शिक्षण संस्था
लातूर

॥ आरोह तमसो ज्योतिः॥

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)



**Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur**

Empowered Autonomous Institution
Faculty of Science and Technology
Department of Information Technology
UG I Sem-I

Course Type : VSC -I

Course Title : Basics of Digital Electronics and Logic Design

Course Code : 101COA1501

Credits : 2

Max. Marks: 50

Lectures: 45 Hrs

Learning Objectives:

- LO 1. Apply number systems, perform interconversions, and carry out arithmetic operations using complement methods.
- LO 2. Analyze and simplify Boolean expressions using laws and implement them using logic gates.
- LO 3. Design and analyze combinational logic circuits such as adders, subtractors, multiplexers, and encoders.
- LO 4. Analyze sequential circuits using flip-flops and explain basic microprocessor components.

Course Outcomes:

After completion of course the student will be able to-

- CO 1. Apply number system conversions and perform binary arithmetic using complement methods.
- CO 2. Analyze and simplify Boolean expressions and implement them using logic gates.
- CO 3. Design and verify combinational logic circuits such as adders, subtractors, multiplexers, and encoders.
- CO 4. Analyze sequential circuits using flip-flops and explain basic microprocessor components and applications.

Unit No.	Title of Unit & Contents	Hrs.
I	Number System	04
	<ul style="list-style-type: none">1. Number system: Binary number system, decimal number system, octal number system, hexadecimal number system.2. Bases inter conversions3. Binary Subtraction using 1's 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	04
	<ul style="list-style-type: none">1. Boolean algebra: Fundamental concepts of Boolean algebra, Symbol, Boolean equation2. 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 Boolean4. 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	03
	<ol style="list-style-type: none"> 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	04
	<ol style="list-style-type: none"> 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 flop 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)	30
	<ol style="list-style-type: none"> To perform and verify the truth tables of basic gates. To perform and verify the truth tables of derived gates. To perform and verify the truth tables of EX-OR and EX-NOR gate. Verify the universal property of NAND gate. Verify the universal property of NOR gate. Implement and verify the truth table of any two Boolean equation. To perform and verify the truth table of Demorgan's Theorem. Verify the truth table of half adder and Full adder. To perform and verify the truth table of multiplexer. Study of microprocessor block diagram 	

Learning Resources:

- Digital Computer Fundamentals, Floyd, Thomas L, 3rd Edition 1997.
- Digital Computer Fundamentals, Malvino, Paul Albert and Leach, Donald P, 3rd Edition, 1995. TMH.
- Modern Digital Electronics, R. P. Jain, 3rd Edition, Tata Mc Graw Hill, 2003.
- Computer Organization and Architecture, William Stallings, Pearson Education 2003
- Computer systems design and architecture, Heuring and Jordan, Pearson Education
- Digital Computer Fundamentals, Bartee, Thomas C, 6th Edition, 1995, TMH
- Digital Electronics, Bignell and Donovan, 5th Edition, Thomson Publication, 2007
- <https://www.geeksforgeeks.org/digital-logic/digital-electronics-logic-design-tutorials/>
- <https://www.tutorialspoint.com/digital-electronics/index.htm>
- <https://de-iitr.vlabs.ac.in/Objective.html>

Internal Examination Pattern :

CAT – I: Assignment Based / Surprise Test

CAT – II: Google Form Online Test / Seminar

Mapping of POs, PSOs and COs:

	PO								PSO					
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	1	2	1	0	1	2	1	0	2	1	1	0
CO2	3	3	2	2	1	0	1	2	1	0	1	2	1	0
CO3	3	3	3	3	1	0	1	2	2	1	2	2	1	1
CO4	3	2	2	2	1	0	1	3	2	1	2	3	1	1

Scale : 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation.

शिव छत्रपती
शिक्षण संस्था
लातूर

॥ आरोग्यं तमसो ज्योतिः ॥

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)

A stylized flame in shades of yellow and orange, contained within a red bowl with a white rim. The bowl is positioned centrally on the page.

Semester - II

लातूर

॥ आरोह तमसो ज्योतिः॥

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)



**Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur**

Empowered Autonomous Institution
Faculty of Science and Technology
Department of Information Technology
UG I Sem-II

Course Type : DSC-III

Course Title : Fundamentals of OOP using C++

Course Code : 101COA2105

Credits : 03

Max. Marks: 75

Lectures: 45 Hrs

Learning Objectives:

- LO 1. Understand the fundamental concepts of Object-Oriented Programming (OOP) and basic C++ programming constructs.
- LO 2. Apply functions, operators, and control structures to develop structured C++ programs.
- LO 3. Analyze the use of classes, objects, constructors, destructors, and advanced features like operator overloading and type conversion in problem solving.
- LO 4. Design solutions using inheritance, polymorphism, and virtual functions to model real-world applications.

Course Outcomes:

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

- CO 1. Explain OOP concepts and implement basic C++ programs using functions, operators, and control structures.
- CO 2. Develop programs using classes, objects, constructors, and destructors.
- CO 3. Apply operator overloading and type conversion techniques in problem solving.
- CO 4. Design and develop C++ applications for real-world problems using inheritance, polymorphism, and virtual functions.

Unit No.	Title of Unit & Contents	Hrs.
I	Basics of OOPs and C++	12
	<p>1. Introduction: Object Oriented Paradigm</p> <p>2. Basic concepts of OOP: Object, Class, Data Abstraction, Encapsulation, Inheritance, Polymorphism, Overloading, Dynamic binding, Message Passing.</p> <p>3. C++ Features: The iostream class, C++ comments, C++ keywords, variable declaration,</p> <p>4. Manipulators: endl, setw, setprecision, Scope resolution operator, new and delete operators.</p> <p>5. Functions: function declaration, calling the function, function definition, passing argument to, returning value from function, pass by value, pass by reference, default arguments, overloaded functions, inline functions</p>	
	<p>Unit Outcomes:</p> <p>UO 1. Understand basic concepts of OOPs</p> <p>UO 2. Able to write logic using functions</p>	
II	Classes and Object	13

Unit No.	Title of Unit & Contents	Hrs.
	<p>1. Classes & objects: class declaration, class members,</p> <p>2. Class member visibility: private, public, protected.</p> <p>3. Constructor and destructor: Default constructor, constructor with argument, constructor with default arguments, copy constructor,</p> <p>4. Member Function: Defined outside the class, objects as arguments, returning objects from functions, manipulating private data members, Array of objects</p>	
	<p>Unit Outcome: UO 1. Implement concept of Class and object UO 2. Understand implementation of constructors, members functions</p>	
III	Overloading and Type Conversion	10
	<p>1. Operator Overloading: Defining operator overloading, overloading unary operator, overloading binary operator</p> <p>2. Data conversion: conversion between basic to class types, conversion between objects and basic types</p>	
	<p>Unit Outcomes: UO 1. Define new meaning to operators using overloading</p>	
IV	Inheritance and Virtual Function	10
	<p>1. Inheritance: Derived class & Base class: Specifying the derived class, accessing the base class members, derived class constructor, overriding member functions, public & private inheritance.</p> <p>2. Level of inheritance: Simple / Single inheritance, Multilevel inheritance, multiple inheritance, hybrid inheritance, Hierarchical inheritance, Hybrid Inheritance, constructors in inheritance.</p> <p>3. Virtual Functions: Introduction, Normal member function accessed with pointers, virtual member function accessed with pointers, this pointer</p>	
	<p>Unit Outcomes: UO 1. Implement various concepts of inheritance to solve real life problems. UO 2. Understand use of virtual functions</p>	

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)

Learning Resources

- Object Oriented Programming with C++, E. Balagurusami, Fourth Edition, Tata Mc-Graw Hill
- Complete Reference C++, Herbert Schildt, Tata McGraw Hill
- Object Oriented Programming in Turbo C++, Robert Lafore, Fourth Edition Galgotia Publications.
- The C++ Programming Language, Bjarne Stroustrup, Third Edition, Addison-Wesley Publishing Company
- The C++ Programming Language (4th Edition), Bjarne Stroustrup
- C++ Primer', Stanley B. Lippman, Josée Lajoie, and Barbara E. Moo
- <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>
10. <https://labex.io/courses/cpp-practice-labs>

Internal Examination Pattern:

CAT – I: Assignment Based / Programming Based Assignment / Surprise Test

CAT – II: Google Form Online Test / Seminar

Mapping of POs, PSOs and COs:

COs	POs								PSOs					
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	2	2	1	0	1	2	3	2	1	2	1	0
CO2	3	3	3	2	1	0	1	2	3	2	1	2	1	0
CO3	3	3	3	3	1	0	1	3	3	2	1	3	1	0
CO4	3	3	3	3	2	1	1	3	3	3	2	3	2	1

Scale : 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation.

॥ आरोह तमसो ज्योतिः॥
Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)



**Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur**

Empowered Autonomous Institution
Faculty of Science and Technology
Department of Information Technology
UG I Sem-II

Course Type : Lab Course

Course Title : Lab Course –III (Based on DSC-III)

Course Code : 101COA2107

Credits : 01

Max. Marks: 50

Lectures: 30 Hrs

Learning Objectives:

- LO 1. Understand syntax and structure of C++ programs using input-output operations and manipulators.
- LO 2. Apply functions, operators, and control structures to solve computational problems.
- LO 3. Demonstrate the use of classes, constructors, destructors, and object-oriented features like overloading in programs.
- LO 4. Analyze and develop complete C++ programs using inheritance and OOP concepts.

Course Outcomes:

- CO 1. Write and execute basic C++ programs using input-output operations and manipulators.
- CO 2. Implement functions, scope resolution, and operators in C++ programs.
- CO 3. Develop class-based programs using constructors, destructors, and operator overloading.
- CO 4. Build complete C++ applications using inheritance and object-oriented programming principles.

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.

Mapping of POs, PSOs and COs:

COs	POs								PSOs					
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	2	2	1	0	1	1	3	2	1	2	1	0
CO2	3	3	3	2	1	0	1	2	3	2	1	2	1	0
CO3	3	3	3	3	1	0	1	2	3	2	1	3	1	0
CO4	3	3	3	3	2	1	1	3	3	3	2	3	2	1

Scale : 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation.



॥ आर्योह तमसो ज्योतिः ॥

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)



**Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur**

Empowered Autonomous Institution
Faculty of Science and Technology
Department of Information Technology
UG I Sem-II

Course Type : DSC-IV		
Course Title : Internet Programming		
Course Code : 101COA2106		
Credits : 03	Max. Marks: 75	Lectures: 45 Hrs

Learning Objectives:

- LO 1. Comprehend the structure and working of the Internet, client-server architecture, HTTP, and URLs.
- LO 2. Use HTML elements including tags, forms, tables, frames, images, hyperlinks, and multimedia to build web pages.
- LO 3. Examine and implement CSS properties, box model, positioning, and layout techniques to enhance web design and usability.
- LO 4. Apply JavaScript, including variables, control structures, functions, arrays, and DOM manipulation, to develop complete web pages.

Course Outcomes:

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

- CO 1. Explain Internet protocols, client-server architecture, and the structure of HTML documents.
- CO 2. Construct web pages using HTML elements such as text formatting, images, links, forms, and multimedia.
- CO 3. Implement CSS styling, positioning, box model, and layout techniques for effective web design.
- CO 4. Develop interactive and dynamic web applications by integrating HTML, CSS, and JavaScript.

Unit No.	Title of Unit & Contents	Hrs.
I	Web Basics and HTML	10
	<ol style="list-style-type: none">1. The Internet: Clients and Servers, Web browser, Internet protocols, Client Server Architecture, HTTP Request and Response, URL2. Introduction to HTML: Basic structure of an HTML document3. Markup Tags: Basic HTML Tags, Physical style tags, Paragraphs, Line breaks, HR, Heading levels, Center, Div, Span, Address, working with text, Lists	
	Unit Outcomes: UO 1. Explain Internet Fundamentals and Web Architecture UO 2. Apply Basic HTML Structure and Markup Tags UO 3. Design Simple Web Pages Using HTML Elements	
II	Advanced HTML Tags and Forms	13
	<ol style="list-style-type: none">1. Working with hyperlink: Hyperlink, Mailto anchor2. Working with Images: Image file formats, tag with its attributes, Images as background, Internal and External image3. Adding multimedia Elements: Audio and Video file formats, Adding audio and Video in html document	

Unit No.	Title of Unit & Contents	Hrs.
	4. Tables: <table> tag with its attributes, Rowspan, colspan 5. Frames: Overview of frames, tag and all attributes, Frame targeting, Floating frames 6. Working with Forms and controls: <form> tag with its attributes, Form controls, <input> tag with its attributes (HTML5 controls). Unit Outcome: UO 1. Apply Hyperlinks and Image Elements in Web Pages UO 2. Integrate Multimedia Elements in HTML Documents UO 3. Construct Tables and Frames for Web Layout	
III	Cascading Style Sheets	12
	1. Concept of CSS 2. Creating Style Sheet: Ways to insert CSS, CSS Properties, CSS Styling (Background, Text Format, Controlling Fonts) 3. Working with block elements and objects 4. Working with Lists and Tables 5. CSS Id and Class 6. Box Model: Introduction, Border properties, Padding Properties, Margin properties 7. CSS Advanced: Grouping, Dimension, Display, Positioning, Floating, Align, Pseudo class, Navigation Bar, Image Sprites, Attribute selector, Color Unit Outcomes: UO 1. Explain CSS Concepts and Styling Techniques UO 2. Apply CSS Properties and Selectors for Web Design	
IV	Basics of JavaScript Programming	10
	1. Adding script to document 2. Javascript: Data types, Operators, Control statements, Looping statements 3. Document Object Model (DOM), DOM Objects (window, navigator, history, location) 4. Predefined functions: Math & string functions 5. Array in Javascript Unit Outcomes: UO 1. Understand JavaScript Fundamentals and Syntax UO 2. Apply Variables, Control Structures, and Functions in JavaScript UO 3. Analyze and Manipulate Web Pages Using DOM and JavaScript Objects	

Learning Resources:

1. Web Publishing, Monica D'Souza, Tata McGraw Hill Publishing, 2001
2. Mastering HTML, CSS & Java Script Web Publishing, Laura Lemay, Rafe Colburn, Jennifer Kyrnin, BPB Publications, 2016
3. HTML & CSS: The Complete Reference, Thomas A. Powell, Fifth Edition, 2010
4. HTML 5 in simple steps, Kogent Learning Solutions Inc., Dreamtech Press
5. Web Development and Design Foundation with HTML 5, Terry Felke-Morris, Ninth Edition, Pearson, 2019
6. A beginner's guide to HTML, NCSA

7. Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP, Ivan Bayross, BPB, 2005
8. C. Xavier, Web Technology And Design, New Age International (P) Limited
9. JavaScript The Complete Reference, Thomas Powell, Fritz Schneider, 3rd Edition, McGraw-Hill Education, 2012
10. Responsive Web Design with HTML5 and CSS, Ben Frain, Packt Publishing Limited, 2022

Internal Examination Pattern :

CAT – I: Assignment Based / Programming Based Assignment / Surprise Test

CAT – II: Google Form Online Test / Seminar

Mapping of POs, PSOs and COs:

COs	POs								PSOs					
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	2	2	1	1	1	2	2	3	1	2	1	0
CO2	3	3	3	2	1	1	1	2	2	3	1	2	1	0
CO3	3	3	3	3	1	1	1	2	2	3	2	2	2	1
CO4	3	3	3	3	2	2	1	3	3	3	2	3	2	2

Scale : 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation.

॥ आरोग्यं तमसो ज्योतिः ॥

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)



**Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur**

Empowered Autonomous Institution
Faculty of Science and Technology
Department of Information Technology
UG I Sem-II

Course Type : Lab Course

Course Title : Lab Course –IV (Based on DSC-IV)

Course Code : 101COM2108

Credits : 01

Max. Marks: 50

Lectures: 30 Hrs

Learning Objectives:

- LO 1. Describe the structure of HTML documents and explain the role of Internet protocols in web communication.
- LO 2. Create web pages using HTML tags such as headings, paragraphs, lists, images, links, tables, and forms...
- LO 3. Examine and apply CSS styling, positioning, and layout strategies to improve web page design and usability...
- LO 4. Write JavaScript programs to implement interactive features such as calculators, date displays, and form validations on web pages

Course Outcomes:

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

- CO 1. Explain the basic structure of HTML documents, Internet protocols, and client-server architecture for web development.
- CO 2. Construct web pages using HTML tags such as headings, paragraphs, lists, images, links, tables, and forms.
- CO 3. Differentiate and implement CSS styling, positioning, and layout strategies to enhance the visual appeal and usability of web pages.
- CO 4. Develop and integrate interactive web applications using JavaScript along with HTML and CSS to create functional, responsive, and user-friendly web solutions.

Practical No.	Experiment Title
1	Prepare a survey document of five websites and find out prerequisite for designing it
2	Design web pages for your college containing a description of the courses, departments, faculties, library etc, Make use of and list tags.
3	Create your class timetable using<table> tag.
4	Create Student feedback form (use textbox, text area, checkbox, radio button, select box etc.)
5	Create a web page using frame. Divide the page into two parts with Navigation links on left hand side of page (width=20%) and content page on right hand side of page (width = 80%). On clicking the navigation Links corresponding content must be shown on the right hand side.
6	Create your resume using HTML tags and make use of colors, text, link, size and also other tags you studied.
7	Design a web page of your home town with an attractive background color, text color, an Image, font etc. (use internal CSS).
8	Use Inline CSS to format your resume that you have created in experiment-6.

9	Use External CSS to format your class timetable as you have created in experiment-3
10	Use External, Internal, and Inline CSS to format college web page that you have created in experiment-2.
11	Write a JavaScript program to display system date.
12	Write a JavaScript program to develop simple calculator for arithmetic operations.
13	Write a JavaScript program to determine whether a given year is a leap year or not.

N.B.: Any Ten Practical from above.

Mapping of POs, PSOs and COs:

COs	POs								PSOs					
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	3	2	2	1	1	1	2	2	3	1	2	1	0
CO2	3	3	3	2	1	1	1	2	2	3	1	2	1	0
CO3	3	3	3	3	1	1	1	3	2	3	2	2	2	1
CO4	3	3	3	3	2	2	1	3	3	3	2	3	2	2

Scale : 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation.

॥ आरोग्यं तमसो ज्योतिः ॥

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)



**Shiv Chhatrapati Shikshan Sanstha's
Rajarshi Shahu Mahavidyalaya, Latur**

Empowered Autonomous Institution
Faculty of Science and Technology
Department of Information Technology
UG I Sem-II

Course Type : VSC-II

Course Title : Applied Statistics for Data Analysis

Course Code : 101COM2502

Credits : 02

Max. Marks: 50

Lectures: 45 Hrs.

Learning Objectives:

- LO 1. Describe fundamental statistical concepts including types of data, variables, frequency distributions, and probability basics.
- LO 2. Apply graphical and diagrammatic techniques to present and interpret data effectively.
- LO 3. Solve probability problems using concepts such as sample space, events, and probability rules.
- LO 4. Analyze time series data, identify its components, and evaluate trends using statistical methods.

Course Outcomes:

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

- CO 1. Understand the basic concepts of statistics including types of data, variables, frequency distributions, and probability.
- CO 2. Apply graphical and diagrammatic methods to represent and interpret data.
- CO 3. Analyze data using statistical techniques and solve probability problems for decision-making.
- CO 4. Analyze time series data and its components to evaluate trends.

Unit No.	Title of Unit & Contents	Hrs.
I	Data Presentation	5
	Attributes and Variables, Discrete and Continuous Variables, Frequency Distribution, Cumulative Frequency Distribution, Graphical Representation: Histogram, Frequency Polygon, Frequency Curve, Ogive, Stem and Leaf Plot.	
	Unit Outcomes: UO 1. Differentiate between attributes and variables, and identify their use in statistical data collection and analysis. UO 2. Construct and interpret frequency distributions for raw data to organize and summarize information effectively.	
II	Diagrammatic Representation	3
	Concept of Diagram, Simple Bar Diagram, Subdivided Bar Diagram, Pie Diagram, Line Graph.	
	Unit Outcome: UO 1. Define the diagrams and explain different types of diagrams. UO 2. Construct appropriate diagrams to represent given data accurately. UO 3. Interpret and compare data presented through different diagrams	

Unit No.	Title of Unit & Contents	Hrs.
	to draw meaningful conclusions.	
III	Probability	4
	Experiment and Sample Space, Events and Operations on Events, Probability of an Event, Basic Probability Rules, Numerical Problems.	
	Unit Outcomes: UO 1. Define experiment, sample space, and events, and explain operations on events along with basic probability rules. UO 2. Solve numerical problems by applying probability concepts.	
IV	Time Series	3
	Introduction to Time Series, Components: Trend, Seasonal, Cyclical, Irregular, Moving Average Method (3, 4, 5 years)	
	Unit Outcomes: UO 1. Define time series and explain its components such as trend, seasonal, cyclical, and irregular variations. UO 2. Calculate and interpret moving averages (3, 4, and 5 years) to identify trends and analyze time series data.	
V	List of Practical (Included in above 04 units)	30
	1. 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. Construct Stem and Leaf Plot. 9. Calculate probability for given data 10. Calculate various moving average method.	

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. <https://www.mathsisfun.com/data/graphs-index.html>

10. <https://atozmath.com/Menu/StatisticsMenu.aspx>

Internal Examination Pattern :

CAT – I: Assignment Based / Surprise Test

CAT – II: Google Form Online Test / Seminar

Mapping of POs, PSOs and COs:

COs	POs								PSOs					
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PSO 1	PSO 2	PSO 3	PSO 4	PSO 5	PSO 6
CO1	3	2	1	3	1	0	1	3	2	1	3	1	2	1
CO2	3	2	1	3	1	0	1	3	2	1	3	1	2	1
CO3	3	3	2	3	2	1	1	3	2	2	3	2	3	1
CO4	3	3	2	3	2	1	1	3	2	2	3	2	3	2

Scale : 3 = High, 2 = Moderate, 1 = Low, 0 = No correlation.

॥ आरोह तमसो ज्योतिः॥

Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)



Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

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.

॥ ज्ञानं हि तमसो ज्योतिः ॥
Rajarshi Shahu Mahavidyalaya,
Latur (Autonomous)



Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

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
		Att.	CAT I	Mid Term	CAT II	Att.	CAT			
1	2	3				4		5	6	5 + 6
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/SEC (Science & Technology)	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