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. Computer Science

Board of Studies

in

B. Sc. Computer Science

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

[UG I Year]

w.e.f. June, 2026

(In Accordance with NEP-2020)

Review Statement

The NEP Cell reviewed the Curriculum of **B.Sc. Computer Science** 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

CERTIFICATE

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

Date:06/04/2026

Place: Latur

(Ms. Jyoti Mashalkar)
Chairperson
Board of Studies in Computer Science
Rajarshi Shahu Mahavidyalaya, Latur
Empowered Autonomous Institution

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	**Ms. Jyoti Mashalkar** Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Chairperson	Coordinator
2	**Dr. Nilesh Deshmukh** Professor, School of Computational Sciences, S.R.T.M. University, Nanded	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, Department of Computer Science, Fergusson College (Autonomous), Pune	Member	Academic Council Nominee
5	**Mr. Jayu Katti** Partner Director of Engineering at Microsoft	Member	Expert from outside for Special Course
6	**Mr. Sudhakar Gavhane** Senior Consultant Specialist with HSBC India Pvt. Ltd., Pune	Member	Expert from Industry
7	**Mr. Vivekanand Naragude** Technical Lead, Fareportal India, Gurugram, Haryana	Member	Alumni
8	**Mr. Riyaj Shaikh** Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Member	Faculty Member
9	**Ms. Chandraprabha Kulkarni** Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Member	Faculty Member
10	**Dr. Manjusha Shinde** Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Member	Faculty Member
11	**Mr. Prashant Joshi** Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Member	Faculty Member
12	**Ms. Pooja Rathod** Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Member	Faculty Member
13	**Mr. Nilesh Bade** Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Member	Faculty Member
14	**Mr. Jairam Kolekar** Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Member	Faculty Member
15	**Ms. Supriya Birajdar (Ghugare)** Assistant Professor, Rajarshi Shahu Mahavidyalaya, Latur (Empowered Autonomous Institution)	Member	Faculty Member

From the Desk of the Chairperson…

It is a great pleasure and honor to present the revised syllabi for the First Year of B.Sc. in Computer Science under the NEP-2020 framework, to be implemented from the academic year 2026-27.

Keeping in mind the mission of the institution, “Pursuit for Excellence,” and adhering to its core values: Academic Excellence, Expanding Horizons of Knowledge, Learning for Life, and Service to the Nation, the revision of the syllabus reflects our continuous commitment to academic quality and excellence in higher education.

NEP-2020 emphasizes key reforms in higher education by promoting a multidisciplinary approach for the holistic development of students. It aims to nurture learners as carriers of knowledge, wisdom, and values, equipping them with the ability to adapt to dynamic changes in the global environment.

The courses designed for the First Year of the B.Sc. Computer Science programme focus on building a strong foundation in core computing concepts, problem-solving skills, and analytical thinking. They offer a balanced combination of theoretical knowledge and practical exposure in areas such as programming, data handling, mathematical foundations, and emerging technologies. Skill-based and value-added components also incorporated to enhance critical thinking, creativity, and interdisciplinary learning.

While revising the syllabi, valuable feedback from stakeholders, recent technological advancements, and the evolving requirements of the global IT industry has considered. This revision aims to further strengthen the curriculum, foster holistic student development, and enhance employability.

I express my sincere gratitude to our Principal, Dr. Mahadev Gavhane; Vice Principal, Prof. Sadashiv Shinde; and Nodal Officer of the NEP Cell, Dr. Anuja Jadhav, along with the entire team, for their continuous guidance and support throughout the process of revising the syllabi for the First Year of B.Sc. Computer Science in alignment with NEP-2020.

I also extend my heartfelt thanks to all the members of the Board of Studies for their valuable suggestions and contributions in shaping the courses for this programme.

Finally, I would like to thank everyone who has been directly or indirectly involved in the syllabus revision process.

Thank you.

Ms. Jyoti Mashalkar

Chairperson

Board of Studies in Computer Science

Rajarshi Shahu Mahavidyalaya, Latur

Empowered Autonomous Institution

Shiv Chhatrapati Shikshan Sanstha's

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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 Science 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	DSCIII: 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 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

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

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Faculty of Science and Technology

B.Sc. Computer Science

Year & Level	Semester	Course Code	Course Title	Credits	No. of Hrs.
I 4.5	I	101COM1101 (DSC-I)	Programming in C	03	45
		101COM1103	Lab Course-I	01	30
		101COM1102 (DSC-II)	Computer Fundamentals and Office Automation	03	45
		101COM1104	Lab Course-II	01	30
		OE-I	From Basket	04	60
		101COM1501 (VSC-I)	Statistical Tools for Data Analysis	02	45
		(SEC-I)	From Basket	02	45
		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	101COM2105 (DSC-III)	C++ Programming	03	45
		101COM2107	Lab Course-III	01	30
		101COM2106 (DSC-IV)	Web Programming with HTML and CSS	03	45
		101COM2108	Lab Course-IV	01	30
		OE-II	From Basket	04	60
		101COM2502 (VSC-II)	Fundamentals of Digital Electronics	02	45
		(SEC-II)	From Basket	02	45
		(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 Science)

Programme Outcomes (POs) for B.Sc. (Computer Science)	
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.

Programme Specific Outcomes (PSOs) for B.Sc. (Computer Science)	
PSO No.	**After completion of this programme, the students will be able to :**
PSO 1	**Algorithmic Thinking and Programming:** Design and implement efficient algorithms and programs using appropriate data structures to solve computational problems.
PSO 2	**Computational Problem Solving:** Apply computational techniques and analytical skills to develop effective solutions for complex problems.
PSO 3	**System-Level Concepts:** Understand and apply operating system concepts and system-level programming principles in computing applications.
PSO 4	**Software and Database Development:** Design, develop, test, and manage software systems and database applications using appropriate tools and technologies.
PSO 5	**Networking and Cybersecurity:** Apply principles of computer networks and cybersecurity to ensure secure and reliable communication systems.
PSO 6	**Emerging Technologies, Innovation and Research:** Explore and apply emerging technologies such as Artificial Intelligence, Machine Learning, and Data Science to develop innovative and research-oriented solutions.

Semester - I

Shiv Chhatrapati Shikshan Sanstha's

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Faculty of Science and Technology

Department of Information Technology

UG I Sem-I

Course Type : DSC-I
Course Title : Programming in C
Course Code : 101COM1101
Credits : 03 **Max. Marks:** 75 **Lectures:** 45 Hrs.

Learning Objectives:

LO 1. To create algorithms and draw flowcharts to solve computational problems.
LO 2. To explain fundamental concepts and techniques of C programming.
LO 3. To apply input/output operations, control structures, and iterative statements in C programs.
LO 4. To develop C programs using arrays, functions, structures, and unions with basic debugging.

Course Outcomes:

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

CO 1. Analyze problems and design algorithms and flowcharts for solutions.
CO 2. Explain and apply basics of C programming, including data types, operators, and program structure.
CO 3. Develop C programs using control structures, arrays, functions, and pointers to solve computational problems.
CO 4. Design, test, and debug C programs for real-world applications.

Unit No.	Title of Unit & Contents	Hrs.
I	**Overview of C**	**12**
	1. Algorithm, Flowchart and its symbols. 2. **Introduction to C:** History of C, Importance of C, Basic structure of C program, Data Types, C tokens, Keywords, Identifiers, Constants, Variables: Declaration of variables, assigning values to variables, Defining symbolic constants, Execution of C program. 3. **Input and Output Statements:** Input statements, Output statements, Reading and writing character, Formatted input and output statements, Command line arguments. 4. **Types of Errors in C:** Syntax errors, Runtime errors, Logical errors.	
	Unit Outcomes: UO 1. Formulate algorithms and construct flowcharts for solving computational problems. UO 2. Explain the basic concepts of C including data types, tokens, variables, constants, and program structure.	
II	**Branching and Looping**	**13**

Unit No.	Title of Unit & Contents	Hrs.
	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. **Storage Classes:** auto, register, static, external. 3. **Branching and Looping:** Simple if statement, Nested, Ladder if-else statement, Switch statement, break, continue, goto, exit statement, while statement, do-while statement, for statement.	
	Unit Outcomes: UO 1. Utilize control and iterative statements for solving given problem. UO 2. Implement branching and looping constructs to develop structured programs.	
III	**Arrays and Strings**	**11**
	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, putting strings together. 3. **String handling functions:** strlen, strcpy, strcat, strcmp, strlwr, strupr.	
	Unit Outcome: UO 1. Employ major concepts of C such as arrays and strings while developing applications.	
IV	**Advanced Concepts of C**	**9**
	1. **Functions:** Definition of function, Return values and their types, Function declaration, Function calls, Categories of function, Nesting of function, Recursion, Mathematical functions. 2. **Structure and Union:** Defining structure, Declaring structure members and structure variables, Arrays as structure, Arrays within structure, Union. 3. **Pointers:** Understanding Pointers, Accessing the address of variables, Declaring and initializing pointers, Accessing a variable through pointers. 4. **File Handling:** Opening and closing file, I/O statements used for file handling: fprintf(), fscanf().	
	Unit Outcomes: UO 1. Design and implement modular programs using functions, including recursion and library functions. UO 2. Develop programs for file handling operations.	

Learning Resources:

1. C: The Complete Reference – Herbert Schildt, 4th Edition, McGraw Hill Publication, 2017
2. Computer Programming and IT – Ashok N. Kamthane, Pearson Education, 2011
3. Computer Programming in C – V. Rajaraman, PHI Learning, 2019
4. Let Us C – Yashwant Kanetkar, 13th Edition, BPB, 2013
5. Programming in ANSI C – E. Balgurusamy, 7th Edition, TMH Publications, 2018

6. Programming in C – P. B. Kotur, Sapna Book House, 2013
7. Programming with ANSI and TURBO C – Ashok N. Kamthane, Pearson Education, 2002
8. Programming with C – S. Byron Gottfried, TMH, 2018
9. The C Programming Language – Kernighan & Ritchie, Prentice-Hall, 1988
10. Thinking in C – Mahapatra, PHI Publications, 1998
11. https://www.w3schools.com

Internal Examination Pattern:

CAT – I: Programming 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	2	0	0	0	0	1	2	3	3	0	0	0	1
CO2	3	2	1	2	0	0	1	1	3	2	0	1	0	0
CO3	3	3	2	2	0	0	1	2	3	3	1	2	0	0
CO4	3	3	2	3	1	1	2	2	3	3	1	3	0	1

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

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 : 101COM1103
Credits : 01 **Max. Marks:** 50 **Lectures:** 30 Hrs.

Learning Objectives:

LO 1. To create algorithms and draw flowcharts to solve computational problems.
LO 2. To explain fundamental concepts and techniques of C programming.
LO 3. To apply input/output operations, control structures, and iterative statements in C programs.
LO 4. To develop C programs using arrays, functions, structures, and unions, and perform basic debugging.

Course Outcomes:

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

CO 1. Analyze computational problems and construct algorithms and flowcharts for their solutions.
CO 2. Explain and apply fundamental concepts of C programming including data types, operators, and program structures.
CO 3. Develop C programs using control structures, arrays, functions, and pointers to solve computational problems.
CO 4. Design, test, and debug C programs for real-world applications.

Practical No.	Unit
1	Write a C program to find the area of a circle. Accept radius from user.
2	Input length and breadth from user and implement a C program to find the area of a rectangle.
3	Write C program to calculate simple interest and compound interest and demonstrate it.
4	Design, write and execute a C program to convert temperature in Fahrenheit to Celsius and Celsius to Fahrenheit.
5	Write C program to find the GCD and LCM of two integer numbers.
6	Design C program to check whether the given integer is even or odd using if condition statement.
7	Write a C program to accept three integers and determine largest among them using if statement.
8	Implement C program to simulate a simple calculator with addition, subtraction, multiplication, division using switch case.
9	Write a C program to print number from 1 to100 which are divisible by 7 and display their sum and count using for loop.

Practical No.	Unit
10	Write a C program to reverse a given integer number and check whether the number is palindrome or not using while loop.
11	Write a C program to check whether given number is prime or not using while loop.
12	Design and implement C program to display the pattern given below using nested for loop * * * * * * * * * * * * * * *
13	Write a C program to read N integers into an array and find sum of all numbers.
14	Design and implement C program to find the addition of two matrices.
15	Implement and demonstrate C program to calculate the factorial of a number using function.
16	Implement C program to demonstrate use of string handling functions.
17	Create structure named as “employee”. Add empid, emp_name and salary as members of it. Display values of these members on screen.
18	Create structure named as “book”. Add bookid, book_name, author_name and price as members of it. Display values of these members on screen.
19	Write a program to demonstrate pointer concept.
20	Write a C program to perform file handling operations using fopen(), fclose(), fprintf(), fscanf().

N.B.: Any ten practicals from above.

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 Office Automation
Course Code : 101COM1102
Credits : 03 **Max. Marks:** 75 **Lectures:** 45 Hrs.

Learning Objectives:

LO 1. To understand fundamental concepts of computer systems, hardware components, and software.
LO 2. To develop skills in using computer peripherals and understanding data representation and storage.
LO 3. To acquire practical skills in creating and formatting documents, spreadsheets, and presentations using MS Office tools.
LO 4. To apply office automation tools for effective academic and professional task completion.

Course Outcomes:

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

CO 1. Explain basic concepts of computer systems, hardware components, and data representation.
CO 2. Identify and use computer peripherals and software applications effectively in day-to-day computing tasks.
CO 3. Create, edit, and format professional documents, spreadsheets, and presentations using MS Office tools.
CO 4. Apply computer fundamentals and office automation tools to develop solutions for academic and real-world problems.

Unit No.	Title of Unit & Contents	Hrs.
I	**Computer System Organization**	**11**
	1. **Introduction to Computer System:** Characteristics of Computers, Generations of computer. 2. **Classification of computers:** Notebook computers, Personal Computers, Workstations, Mainframes system, Supercomputers. 3. **Basic Computer Organization:** Input Unit, Output Unit, Storage Unit, Arithmetic and Logic Unit (ALU), Control Unit (CU), Central Processing Unit (CPU). 4. **Data Representation within Computer:** Bit, Byte, Word. 5. **Codes:** ASCII, EBCDIC, BCD.	
	Unit Outcomes: UO 1. Explain basics of Computer System UO 2. Describe data representation in computer	

Unit No.	Title of Unit & Contents	Hrs.
II	**Computer Peripherals and Software**	**13**
	1. **Input Devices:** Keyboard, Pointing devices: Mouse, Joystick, Touch Screen, Data Scanning devices, Digitizer, Electronic Card Reader, Voice Recognition devices. 2. **Output Devices:** Monitor, Printer, Plotter, Screen image projector, voice response system. 3. **Primary Storage Devices:** RAM, ROM, PROM, EPROM, EEPROM, Base Memory, Extended memory, expanded memory, cache memory. 4. **Secondary Storage Devices:** Tape, FDD, HDD, CD ROM, Pen drive. 5. **Computer Software:** Definition of software, Types of software. 6. **Types of Programming Languages:** Machine Language, Assembly Language, High Level Language.	
	Unit Outcome: UO 1. Use computer peripherals such as input, output and storage devices effectively	
III	**MS-Word**	**11**
	1. MS-Word Screen and its Components. 2. **Working with Text:** Typing and inserting text, selecting text, deleting text, Undo, formatting toolbar, Format Painter. 3. **Formatting Paragraphs:** Moving, Copying, and Pasting text, the clipboard, Columns, Drop caps. 4. **Lists and Table Manipulations:** Bulleted and numbered lists, Insert table, Drawing a table, Inserting rows and columns, Moving and resizing a table, Tables and Borders. 5. **Page Formatting:** Page margins, Page size and orientation, Headers and footers, Page numbers, Print preview and printing.	
	Unit Outcomes: UO 1. Differentiate between various office related software applications UO 2. Utilize MS-Word tool effectively to perform documentation work	
IV	**MS-Excel and MS-PowerPoint**	**10**
	1. **Working with worksheet:** Adding worksheets, Rows and columns, Resizing rows and columns, Selecting cells, Moving and copying cells, Freezing panes. 2. **Formulas and Functions:** Formulas, linking worksheets, Relative, absolute, and mixed referencing, Basic functions, Function Wizard, Autosum. 3. **Sorting and Filling:** Basic ascending and descending sorts, Autofill Alternating text and numbers. 4. **Charts:** Chart Wizard, Resizing a chart, Moving a chart, Chart formatting toolbar. 5. Creating a presentation from a template, Create a blank presentation, Open an existing presentation. 6. **Working with Slides:** Insert a new slide, Applying a design template, Changing slide layouts, Reordering slides, Hide slides, Create a custom slide show, Edit a custom slide show. 7. **Slide Effects:** Slide animation, Animation preview, Slide transitions, Slide show options, Master Slides, Slide master, Header and footer, Slide numbers, Date and time.	
	Unit Outcomes: UO 1. Use advanced formulas and functions to represent data in MS-Excel UO 2. Create effective presentations on a particular topic	

Learning Resources:

1. Computer Fundamentals: Pradeep K. Sinha and Priti Sinha, Sixth Edition, BPB Publication, 2017
2. Computer Fundamentals: Anita Goel, Pearson Education, 2010
3. Foundations of Computing: Pradeep K. Sinha, Priti Sinha, Fifth Edition, BPB Publications, 2022
4. Fundamentals of Computer and Information Technology: R. S. Salaria, Khanna Publishers, 2022
5. Fundamentals of Computers: V. Rajaraman, Neeharika Adabala, PHI Learning Pvt. Ltd., 2015
6. Fundamentals of Computers: Reema Thareja, Oxford, 2014
7. Fundamentals of Computers and Information System: Niranjan Shrivastava, Wiley India, 2013
8. Introduction to Computers: Peter Norton, Tata McGraw Hill, 1995
9. Microsoft Excel 2019 Bible: Michael Alexander, Wiley, 2019
10. Microsoft Office 2016 Step By Step: Curtis Frye, Joan Lambert, Microsoft Press, 2015
11. PC Hardware: The Complete Reference: Tata McGraw Hill, 2017
12. Working with MS OFFICE: Ron Mansfield, Tata Mc Graw Hill, 2000

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	1	1	2	0	1	1	1	2	2	2	1	1	1
CO2	2	2	3	2	1	2	2	1	2	2	1	2	2	1
CO3	2	2	3	2	1	2	2	1	2	2	1	3	1	2
CO4	3	2	3	2	2	2	2	2	3	3	2	3	2	2

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

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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 : 101COM1104
Credits : 01 **Max. Marks:** 50 **Lectures:** 30 Hrs.

Learning Objectives:

LO 1. To understand fundamental concepts of computer systems, hardware components, and software.
LO 2. To develop skills in using computer peripherals and understanding data representation and storage.
LO 3. To acquire practical skills in creating and formatting documents, spreadsheets, and presentations using MS Office tools.
LO 4. To apply office automation tools for effective academic and professional task completion

Course Outcomes:

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

CO 1. Explain the basic concepts of computer systems, hardware components, and data representation.
CO 2. Identify and use computer peripherals and software applications effectively in day-to-day computing tasks.
CO 3. Create, edit, and format professional documents, spreadsheets, and presentations using MS Office tools.
CO 4. Apply computer fundamentals and office automation tools to develop solutions for academic and real-world problems.

Practical No.	Unit
1	Identify computer hardware components and software applications.
2	Study of elements of Windows OS.
3	Study of Windows explorer: a. Create a new folder and a file b. Copy the created file to a new folder c. Rename, Copy and Delete the created file and folder
4	Study of control panel.
5	Demonstrate the usage of various storage devices.
6	Create an application and prepare a resume to apply for a job in a IT company. Apply page and paragraph formatting to the above document.
7	Create a newspaper document with at least 200 words in two columns format and having an image.

<table>
<tr><td>8</td><td>Create a table using two columns: the left column contains all the short-cut keys and right side column contains the function of the short-cut keys.</td></tr>
<tr><td>9</td><td>Create a letter to invite your friend for a family function with at least 100 words and two paragraphs. The date must be in top-right corner.</td></tr>
<tr><td>10</td><td>Creating document using AI tool.</td></tr>
<tr><td>11</td><td>Create a table “Student_Result” in MS-Excel with following fields. Sr. No., Name, Sub1, Sub2, Sub3, Total, Percentage, Result. Calculate Total and Percentage.</td></tr>
<tr><td>12</td><td>Create a sales table using the following data and draw the bar-graph to compare the sales of the five items for three years:
<table>
<tr><th>Item</th><th>2019</th><th>2020</th><th>2021</th></tr>
<tr><td>Item1</td><td>1000</td><td>1200</td><td>1100</td></tr>
<tr><td>Item2</td><td>950</td><td>1200</td><td>1150</td></tr>
<tr><td>Item3</td><td>1100</td><td>900</td><td>1250</td></tr>
</table></td></tr>
<tr><td>13</td><td>Create presentation of seminar on a particular topic with minimum five slides. Apply animation to the presentation.</td></tr>
<tr><td>14</td><td>Create presentation of books of Computer Science with all its details. Apply text formatting animation to the presentation.</td></tr>
<tr><td>15</td><td>Creating PPT using AI tools.</td></tr>
</table>

N.B.: Any ten practicals 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	1	1	2	0	1	1	1	2	2	2	1	1	1
CO2	2	2	3	2	1	2	2	1	2	2	1	2	2	1
CO3	2	2	3	2	1	2	2	1	2	2	1	3	1	2
CO4	3	2	3	2	2	2	2	2	3	3	2	3	2	2

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

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 : Statistical Tools for Data Analysis
Course Code : 101COM1501
Credits : 02 **Max. Marks:** 50 **Lectures:** 45 Hrs.

Learning Objectives:

LO 1. To understand fundamental statistical concepts including data types, variables, and frequency distributions
LO 2. To develop skills in presenting data using graphical and diagrammatic techniques
LO 3. To apply basic probability concepts and rules for solving problems
LO 4. To analyze and interpret statistical data including time series using appropriate methods

Course Outcomes:

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

CO 1. Explain and organize statistical data using appropriate concepts and frequency distributions
CO 2. Represent and interpret data using graphs and diagrams effectively
CO 3. Apply probability rules to solve numerical problems
CO 4. Analyze data and identify trends using statistical and time series techniques

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. UO 3. Create and analyze stem-and-leaf plots to display data in a simple and informative way while preserving original values.	
II	**Diagrammatic Representation**	**3**
	Concept of Diagram, Simple Bar Diagram, Subdivided Bar Diagram, Pie Diagram, Line Graph.	
	Unit Outcomes: 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 to draw meaningful conclusions.	
III	**Probability**	**4**

Unit No.	Title of Unit & Contents	Hrs.
	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 (Based on above 4 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. Construct 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 for given data. 9. Calculate probability for given problems using basic probability rules. 10. Compute and analyze moving averages for given data.	

Learning Resources:

1. R. K. Ghosh and S. Saha, Business Mathematics and Statistics, New Central Book Agency (P) Ltd, 2016
2. Stephen Bernstein and Ruth Bernstein, Elements of Statistics 1: Descriptive Statistics and Probability, McGraw Hill, 2020
3. S. C. Gupta, Fundamentals of Applied Statistics, Sultan Chand and Sons, 2014
4. S. C. Gupta and V. K. Kapoor, Fundamentals of Mathematical Statistics, Sultan Chand & Sons, 2000
5. A. M. Gun, M. K. Gupta and B. Dasgupta, Fundamentals of Statistics, World Press, 2016
6. Modern Elementary Statistics by J. E. Freund, Pearson Education, 2000
7. K. S. Trivedi, Probability and Statistics with Reliability, Queuing and Computer Science Applications, Wiley, 2016
8. S. P. Gupta, Statistical Methods, Sultan Chand and Sons, 2021
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**	**PSO4**	**PS O5**	**PSO 6**
CO1	3	1	2	2	1	1	1	1	1	3	1	2	0	1
CO2	2	1	3	2	0	2	1	1	1	3	0	2	2	1
CO3	3	2	2	2	0	1	1	2	2	3	1	2	1	1
CO4	3	2	2	3	1	2	2	2	2	3	0	3	0	2

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

Semester - II

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 : C++ Programming
Course Code : 101COM2101
Credits : 03 **Max. Marks:** 75 **Lectures:** 45 Hrs.

Learning Objectives:

LO 1. To describe OOP concepts and C++ basics.
LO 2. To understand concept like classes, objects, and functions used for program development.
LO 3. To apply inheritance and polymorphism in C++ programs.
LO 4. To perform file handling and exception handling in C++.

Course Outcomes:

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

CO 1. Explain OOP concepts and basic C++ syntax and features.
CO 2. Develop C++ programs using classes, objects, and functions.
CO 3. Apply inheritance, polymorphism, and operator overloading in programs.
CO 4. Implement file handling and exception handling in C++ applications.

Unit No.	Title of Unit & Contents	Hrs.
I	**Overview of Object Oriented Programming**	**10**
	1. **Introduction:** Object Oriented Programming (OOP) paradigm. 2. **Basic concepts of OOP:** Object, class, data Abstraction, encapsulation, inheritance, polymorphism, dynamic binding and message passing. 3. **C++ Features:** The iostream class, data types, keywords, comments, variable declaration, I/O statement, structure of C++ program, scope resolution operator, new and delete operators. 4. **Manipulators:** endl, setw, setprecision.	
	Unit Outcomes: UO 1. Explain OOP concepts and fundamental C++ constructs. UO 2. Apply basic features such as scope resolution operator, manipulators to develop simple programs.	
II	**Classes and Objects**	**13**
	1. **Functions:** Function declaration and definition, Calling the function, Pass by value, Pass by reference, Default arguments, Inline functions. 2. **Classes and Objects:** Specifying a class, Class member visibility: private, public, protected. Creating objects, accessing class members, Defining member functions, Array of objects, Friend function. 3. **Constructors and Destructors:** Constructors, Types of constructor: Default constructor, Parameterized constructor and Copy constructor, Destructor.	

Unit No.	Title of Unit & Contents	Hrs.
	Unit Outcomes: UO 1. Apply constructor and destructor functions of C++ in program development. UO 2. Design and implement classes and objects using appropriate access specifiers.	
III	**Inheritance and Polymorphism**	**12**
	1. Inheritance: Derived class and base class, Specifying the derived class, Visibility of inherited members, Accessing the base class members. **Types of inheritance:** Single inheritance, Multilevel inheritance, Multiple inheritance, Hierarchical inheritance, Hybrid inheritance, Virtual base classes, Virtual function, Pure virtual functions. **2. Polymorphism:** Compile time and run time polymorphism, Function overloading. **3. Operator Overloading:** Concept of operator overloading, Defining operator overloading, Overloading unary and binary operators.	
	Unit Outcomes: UO 1. Analyze and implement different types of inheritance in C++ UO 2. Design and implement classes and objects using appropriate access specifiers	
IV	**Exception and File Handling**	**10**
	1. **Exception handling mechanism**: Try, catch and throw blocks. 2. Input streams and Output streams. 3. Implementing various file operations (write, read, append and modify).	
	Unit Outcomes: UO 1. Explain and implement exception-handling mechanisms in C++ to handle runtime errors. UO 2. Develop programs performing file operations and integrating error handling for robust applications.	

Learning Resources:

1. Complete Reference C++, Herbert Schildt, Tata McGraw Hill, 2017
2. Object Oriented Programming with C++, E. Balagurusami, Fourth Edition, Tata Mc-Graw Hill, 2008
3. Object Oriented Programming with ANSI & Turbo C++, Ashok N. Kamthane, First Edition, Pearson Education, 2006
4. Programming with C++, John R. Hubbard, Schaum's Outline Series, McGraw Hill, 2000
5. The C++ Programming Language, Bjarne Stroustrup, Third Edition, Addison-Wesley Publishing Company, 1997
6. A Complete Reference to C++, Salaria, R. S., First Edition, Khanna Book Publishing, 2017
7. Object-Oriented Programming in C++, Robert Lafore, Fourth Edition, Sams Publishing, 2001
8. Let Us C++, Yashavant Kanetkar, Second Edition, BPB Publications, 2003
9. The C++ Programming Language, Bjarne Stroustrup, Third Edition, Addison-Wesley Educational Publishers Inc, 2014
10. Object Oriented Programming and C++, R. Rajaram, New Age International Publisher, 2007

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
CO 1	3	1	1	0	0	0	1	0	3	2	1	0	1	0
CO 2	3	3	2	2	1	1	2	0	3	3	1	2	0	0
CO 3	3	3	2	2	0	0	2	1	3	3	2	2	0	1
CO 4	3	3	2	3	1	0	2	2	2	3	2	3	1	1

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

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 : 101COM2103
Credits : 01 **Max. Marks:** 50 **Lectures:** 30 Hrs.

Learning Objectives:

LO 1. To describe OOP concepts and C++ basics.
LO 2. To understand concept like classes, objects, and functions used for program development.
LO 3. To apply inheritance and polymorphism in C++ programs.
LO 4. To perform file handling and exception handling in C++.

Course Outcomes:

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

CO 1. Explain OOP concepts and basic C++ syntax and features.
CO 2. Develop C++ programs using classes, objects, and functions.
CO 3. Apply inheritance, polymorphism, and operator overloading in programs.
CO 4. Implement file handling and exception handling in C++ applications.

Practical No.	Unit
1	Write and implement a program to demonstrate basic structure of C++ and I/O operations.
2	Implement a program to perform arithmetic operations using operators.
3	Write a program to demonstrate pass by value and pass by reference.
4	Write and implement a program to demonstrate default arguments and inline functions.
5	Write and execute a program to demonstrate concept of class and accessing its members.
6	Write a program to implement constructors (default & parameterized).
7	Implement a program in C++ to demonstrate copy constructor and destructor.
8	Write a program to demonstrate friend function and array of objects.
9	Write and implement a program for demonstrating single and multilevel inheritance.
10	Write and implement a program for demonstrating multiple inheritance.
11	Write and execute a program to demonstrate function overloading.
12	Write a Program to demonstrate overloading of unary/binary operators.
13	Implement a program to perform file operations (read, write, append).
14	Write a program to demonstrate concept of exception handling and integrate with file handling.

N.B.: Any Ten Practicals 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**
CO 1	3	1	1	0	0	0	1	0	3	2	1	0	0	0
CO 2	3	3	2	2	1	1	2	0	3	3	1	2	0	0
CO 3	3	3	2	2	0	0	2	1	3	3	2	2	0	1
CO 4	3	3	2	3	1	0	2	2	2	3	2	3	1	1

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

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

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Faculty of Science and Technology

Department of Information Technology

UG I Sem-II

Course Type : DSC-IV
Course Title : Web Programming with HTML and CSS
Course Code : 101COM2106
Credits : 03 **Max. Marks:** 75 **Lectures:** 45 Hrs.

Learning Objectives:

LO 1. To understand Internet structure, client-server architecture, HTTP, and URLs.
LO 2. To develop web pages using HTML tags, forms, tables, images, and multimedia elements.
LO 3. To apply CSS concepts including styling, box model, positioning, and layout design.
LO 4. To use JavaScript and DOM manipulation to create interactive web pages.

Course Outcomes:

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

CO 1. Explain Internet fundamentals, client-server architecture, and HTML document structure.
CO 2. Construct web pages using HTML elements such as forms, tables, links and multimedia.
CO 3. Apply CSS styling techniques including box model, positioning, and layout design.
CO 4. Develop interactive web applications using JavaScript and DOM manipulation.

Unit No.	Title of Unit & Contents	Hrs.
I	**Web Basics and HTML**	**10**
	1. The Internet: Clients and Servers, Web browser, Internet protocols, Client Server Architecture, HTTP Request and Response, URL **2. Introduction to HTML:** Basic structure of an HTML document **3. Markup Tags:** Basic HTML Tags, Physical style tags, Paragraphs, Line breaks, HR, Heading levels, Center, Div, Span, Address, **4. Working with text and 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**
	1. Working with hyperlink: Hyperlink, Mailto anchor **2. Working with Images:** Image file formats, <img> tag with its attributes, Images as background, Internal and External image **3. Adding multimedia Elements:** Audio and Video file formats, Adding audio and video in HTML document **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.	

Unit No.	Title of Unit & Contents	Hrs.
	Unit Outcomes: 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 sector, Color.	
	Unit Outcomes: UO 1. Familiarize with 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. Working with local and global variables 3. Javascript data types, Operators, Control statements, Looping statements 4. Document Object Model (DOM), DOM Objects (window, navigator, history, location) 5. Predefined functions: Math and string functions 6. Array in Javascript	
	Unit Outcomes: UO 1. Explain 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. HTML 5 in Simple Steps, Kogent Learning Solutions Inc., Dreamtech Press
2. HTML & CSS: The Complete Reference, Thomas A. Powell, Fifth Edition, 2010
3. JavaScript: The Complete Reference, Thomas Powell, Fritz Schneider, 3rd Edition, McGraw-Hill Education, 2012
4. Mastering HTML, CSS & JavaScript Web Publishing, Laura Lemay, Rafe Colburn, Jennifer Kyrnin, BPB Publications, 2016
5. Responsive Web Design with HTML5 and CSS, Ben Frain, Packt Publishing Limited, 2022
6. Web Development and Design Foundation with HTML 5, Terry Felke-Morris, Ninth Edition, Pearson, 2019
7. Web Enabled Commercial Application Development Using HTML, JavaScript, DHTML and PHP, Ivan Bayross, BPB, 2005
8. Web Publishing, Monica D'Souza, Tata McGraw Hill Publishing, 2001

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**
CO 1	3	1	2	1	1	0	1	0	2	2	1	1	1	1
CO 2	3	3	3	2	0	1	2	0	3	3	1	3	1	1
CO 3	3	3	3	2	1	1	2	1	3	3	1	3	0	2
CO 4	3	3	3	3	0	1	2	2	3	3	2	3	1	2

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

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. To understand Internet structure, client-server architecture, HTTP, and URLs.
LO 2. To develop web pages using HTML tags, forms, tables, images, and multimedia elements.
LO 3. To apply CSS concepts including styling, box model, positioning, and layout design.
LO 4. To use JavaScript and DOM manipulation to create interactive web pages.

Course Outcomes:

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

CO 1. Explain Internet fundamentals, client-server architecture, and HTML document structure.
CO 2. Construct web pages using HTML elements such as forms, tables, links and multimedia.
CO 3. Apply CSS styling techniques including box model, positioning, and layout design.
CO 4. Develop interactive web applications using JavaScript and DOM manipulation.

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 inexperiment-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 and implement a JavaScript program to develop simple calculator for arithmetic

Practical No.	Experiment Title
	operations.
13	Write a JavaScript program to determine whether a given year is a leap year or not.
14	Creating website using AI tool

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
CO 1	3	1	2	1	1	0	1	0	2	2	1	1	1	1
CO 2	3	3	3	2	1	1	2	0	3	3	1	3	1	1
CO 3	3	3	3	2	0	1	2	1	3	3	1	3	0	2
CO 4	3	3	3	3	1	1	2	2	3	3	2	3	1	2

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

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: Fundamentals of Digital Electronics
Course Code:101COM2502
Credits: 02 **Max. Marks:** 50 **Lectures:** 45 Hrs.

Learning Objectives:

LO 1. To understand number systems, codes, and their conversions.
LO 2. To explain logic gates and Boolean algebra concepts.
LO 3. To design combinational logic circuits for digital applications.
LO 4. To analyze sequential circuits and basic microprocessor concepts.

Course Outcomes:

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

CO1. Explain number systems, codes, and perform conversions.
CO2. Describe logic gates and apply Boolean algebra.
CO3. Design combinational logic circuits such as adders, encoders, and multiplexers.
CO4. Illustrate sequential circuits and explain basic microprocessor architecture.

Unit No.	Title of Unit & Contents	Hrs.
I	**Number System and Codes**	**5**
	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 4. Decimal subtraction using 9's and 10's complement method 5. **Codes:** BCD, GRAY, EXCESS-3.	
	Unit Outcomes: UO 1. Explain number systems and their conversions UO 2. Differentiate codes used in computer	
II	**Logic Gates and Boolean Algebra**	**4**
	1. **Basic gates (AND, OR, NOT):** Truth table, Definition, Boolean expression and symbols 2. **Universal gates (NAND, NOR):** Truth table, Definition, Boolean expression and symbols, Design of basic gates using NAND and NOR gates, Universal property of NAND and NOR gates	

	3. **Demorgan's Theorems:** Theorem, Proofs, Formula and Examples 4. **Boolean Algebra:** Fundamental concepts of Boolean algebra, Symbol, Boolean equation, Basic laws of Boolean algebra and simplification of Boolean expressions.	
	Unit Outcomes: UO 1. Explain the operation of basic and universal logic gates UO 2. Apply Boolean laws for minimizing Boolean expressions	
III	**Combination Logic Circuits**	**3**
	Combination logic: Introduction, Design procedure, Design of half adder and full adder, half subtractor and full subtractor, Encoder, Decoder, Multiplexer (4:1 and 8:1), De-multiplexer (1:4 and 1:8).	
	Unit Outcomes: UO 1. Design and illustrate various combinational logic circuits. UO 2. Explain working of microprocessor	
IV	**Sequential Logic Circuits and Microprocessor**	**3**
	1. Sequential logic: Introduction, Flip-flops- SR flip flop, D flip flop, JK flip flop and T flip flop. **2. Microprocessors:** Introduction, Basic components of microprocessor.	
	Unit Outcomes: UO 1. Implement and illustrate various sequential logic circuits. UO 2. Explain working of microprocessor	
V	**Practicals (Based on above 4 units)**	**30**
	1. Perform an experiment to verify the truth tables of basic gates. 2. Perform an experiment to verify the truth tables of derived gates. 3. Perform an experiment to verify the truth tables of EX-OR and EX-NOR gate 4. Perform an experiment to verify the universal property of NAND gate. 5. Perform an experiment to verify the universal property of NOR gate. 6. Implement and verify the truth table of Demorgan's Theorem. 7. Implement and verify the truth table of any two Boolean equations 8. Implement and verify the truth table of half adder and full adder. 9. Implement and verify the truth table of multiplexer. 10. Study of microprocessor block diagram and identify its components.	

Learning Resources:

1. Computer System Architecture, M. Moris Mano, Second Edition, Prentice Hall of India, 1982

2. Computer Systems Design and Architecture, Heuring and Jordan, Pearson Education, 1996
3. Computer Organization and Architecture, William Stallings, Pearson Education 2003
4. Structured Computer Organization, Andrew S Tenenbaum, Third Edition, Prentice Hall of India (1990)
5. Modern Digital Electronics, R.P. Jain, Fourth edition, Mc Graw Hill, 2009
6. Digital electronics, G.K. Kharate, Oxford, 2010
7. Digital Computer Electronics, Albert Malvino, McGraw Hill Education, 2017
8. Digital Electronics: Principles and Applications, Roger Tokheim, McGraw Hill Education, 2017
9. Digital Electronics: An Introduction to Theory and Practice, Gothmann W.H., Prentice Hall India Learning Private Limited, 1982
10. Introduction to Electronic Devices, Michael Shur, John Wiley & Sons Inc., 2000.

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**
CO 1	3	1	2	1	1	0	1	0	2	2	1	1	1	1
CO 2	3	2	2	1	1	0	1	0	3	2	2	1	1	1
CO 3	3	3	2	2	0	1	2	1	3	3	2	3	0	1
CO 4	3	3	2	2	1	1	2	1	3	3	3	2	1	2

Shiv Chhatrapati Shikshan Sanstha's

Rajarshi Shahu Mahavidyalaya, Latur

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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

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
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/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