Shri Rawatpura Sarkar University, Raipur

Examination Scheme & Syllabus

For

Bachelor of Science in Computer Science & Information Technology

In

Computer Science

Semester-III

(Effective from the session: 2022-23)

Faculty of Engineering,
Shri Rawatpura Sarkar University, Raipur

SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR, CHHATTISGARH

FACULTY OF ENGINEERING

Three Years B.Sc(CS & IT) Programme

Scheme of Teaching and Examination

Bachelor of Science with Computer Science – III[rd] Semester

Computer Science Engineering

Outcome Based Education (OBE) and Choice Based Credit System (CBCS)

(**Effective from the Academic Year 2022-2023**)

S.No.	Course Code	Course Title	Hours / Week			Credits	Maximum Marks			Sem End Exam Duration (Hrs)
			L	T	P		Continuous Evaluation	Sem End Exam	Total	
1	SBS04301	Computer Networks	3	1	-	4	30	70	100	3 Hrs.
2	SBS04302	Internet Technologies	3	1	-	4	30	70	100	3 Hrs
3	SBS04303	Data Structure	3	1	-	4	30	70	100	3 Hrs
4	SBS04304	Programming in Java	3	1	-	4	30	70	100	3 Hrs.
5	SBS04391	Data Structure Lab	-	-	4	2	15	35	50	3 Hrs.
6	SBS04392	Programming in Java Lab	-	-	4	2	15	35	50	3 Hrs.
7.	SBS04392	Web Technology Lab	-	-	4	2	15	35	50	3 Hrs.
Total Contact hr. per week: 30			**Total Credit**			**24**	**180**	**420**	**550**	

SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR, CHHATTISGARH

FACULTY OF COMPUTER SCIENCE & ENGINEERING

B.Sc(CS & IT) Third Semester

<table>
<tr><td>Course Title</td><td colspan="5">COMPUTER NETWORK</td></tr>
<tr><td>Course Code</td><td colspan="5">SBS04301</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>TC</td><td></td></tr>
<tr><td>3</td><td>1</td><td>-</td><td>4</td><td></td></tr>
<tr><td>Prerequisites</td><td colspan="5">Basic knowledge of data communication and networking.</td></tr>
<tr><td>Course Objectives</td><td colspan="5">1. Understand the basic computer networking knowledge.
2. To develop an understanding of computer networking basics.
3. To develop an understanding of different components of computer networks, various protocols, modern technologies and their applications.</td></tr>
<tr><td>Course Contents</td><td colspan="5">UNIT - I
Introduction: - OSI, TCP/IP and other networks models, Examples of Networks: Novell Networks, Arpanet, Internet, Network Topologies WAN, LAN, and MAN. Physical Layer: Transmission media copper, twisted pair wireless, switching and encoding asynchronous communications.
UNIT - II
Data link layer: - Design issues, framing, error detection and correction, CRC, Elementary Protocol-stop and wait, Sliding Window, Slip, Data link layer in HDLC, Internet, ATM. Multiple Access Protocols, Link Layer Addressing, ARP, DHCP, Ethernet,Hubs, Bridges, and Switches. Ring TopologyPhysical Ring, Logical Ring.
UNIT - III
Network Layer: - Forwarding and Routing , Network Service Models, Virtual Circuit and Datagram Networks, Router, Internet Protocol (IP) , IPv4 and IPv6, ICMP, Link State Routing, Distance Vector Routing, Hierarchical Routing, RIP,OSPF, BGP, Broadcast and Multicast Routing, MPLS, Mobile IP, IP sec.
UNIT - IV
Transport Layer: - Transport Layer Services, Multiplexing and De-multiplexing, UDP, Reliable Data Transfer , Go Back - N and Selective Repeat. Connection - Oriented Transport: TCP, Segment Structure, RTT estimation, Flow Control, Connection Management, Congestion Control, TCP Delay Modelling, SSL and TLS. Integrated and Differentiated Services
UNIT - V
Application Layer: - Principles of Network Applications , The Web and HTTP, FTP,</td></tr>
</table>

	Electronic Mail, SMTP, Mail Message Formats and MIME, DNS, Socket Programming with TCP and UDP. Multimedia Networking:,Internet Telephony , RTP, RTCP RTSP. Network Security: - Principles of Cryptography, Firewalls , Application Gateway.
Course Outcomes	1. After completion of this course the students will be able to apply for basic knowledge about Network functions. 2. Recognize the technological trends of Computer Networking. 3. Discuss the key technological components of the Network. 4. Evaluate the challenges in building networks and solutions to those.
Text Books	1. Data Communications and Networking – Behrouz A. Forouzan. Third Edition. 2. James F. Kurose and Keith W. Ross.
Reference Books	1. Computer Networking: A Top-Down Approach Featuring the Internet", Pearson. 2. Financial Accounting B.Com First Year CCS University Meerut New syllabus Academic Year Dr. S.M. Shukla.

SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR, CHHATTISGARH

FACULTY OF COMPUTER SCIENCE & ENGINEERING

B.Sc(CS & IT) Third Semester

Course Title	**INTERNET TECHNOLOGIES**				
Course Code	**SBS04302**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites	Basic knowledge of data communication and networking.				
Course Objectives	1. To understand the historical background and evolution of today's Internet. 2. To examine network topologies and models (OSI model). 3. To develop an understanding of the technological foundations of the Internet and core Internet protocols (TCP/IP, SMTP, FTP, Telnet, ICMP, RSS, and HTTP). 4. To develop advanced web publishing and design skills using the Hypertext Markup Language (HTML);				
Course Contents	**UNIT - I** **Networking Protocols and Internet:** Introduction, Protocols in Computer Communications, the OSI Model, OSI Layer Functions. Why Internet Working?, Problems in Internet Working, Dealing with Incompatibility Issues, A Virtual Network, Internet Working Devices, Repeaters, Bridges, Routers, Gateways, A Brief History of the Internet, Growth of the Internet. **Introduction to WWW :** Protocols and programs, secure connections, application and development tools, the web browser, Web Design: Web site design principles, planning the site and navigation. **UNIT – II** **Introduction to HTML :** The development process,Html tags and simple HTML forms, web site structure Introduction to XHTML : XML, Move to XHTML, Meta tags, Character entities, frames and frame sets, inside browser. **DHTML :** Combining HTML, CSS and Javascript, events and buttons, controlling your browser. **Style sheets :** Need for CSS, introduction to CSS, basic syntax and structure, using CSS, background images, colors and properties, manipulating texts, using fonts, borders and boxes, margins, padding lists, positioning using CSS, CSS2. **UNIT - III** **Javascript and AJAX :** Client side scripting, What is Javascript, How to develop Javascript, simple Javascript, variables, functions, conditions, loops and repetition.				

	AJAX: Introduction, How AJAX Works? , Life without AJAX, AJAX Coding, Life with AJAX. **UNIT - IV** **XML :** Introduction to XML, uses of XML, simple XML, XML key components, DTD and Schemas, Well formed, using XML with application.XML, XSL and XSLT. Introduction to XSL, XML transformed simple example, XSL elements, transforming with XSLT. **UNIT - V** **Web Hosting :** registering domains, parking websites, publishing with FTP. **PHP :** Starting to script on server side, Arrays, function and forms, advance PHP Databases : Basic command with PHP examples, Connection to server, creating database, selecting a database, listing database, listing table names creating a table, inserting data, altering tables, queries, deleting database, deleting data and tables, PHP myadmin and database bugs.
Course Outcomes	1. Analyze a web page and identify its elements and attributes. 2. Create web pages using XHTML and Cascading Style Sheets. 3. Build dynamic web pages using JavaScript (Client side programming). 4. Create XML documents and Schemas. 5. Build interactive web applications using AJAX.
Text Books	1. Achyut Godbole,Atul Kahate"Web Technologies:TCP/IP,Web/Java Programming, and Cloud Computing",Third Edition,McGraw Hill Education.
Reference Books	1. Steven Holzner,"HTML Black Book" Dremtech press. 2. Web Technologies, Black Book, dreamtech Press. 3. Web Applications : Concepts and Real World Design, Knuckles, Wiley-India 4. Internet and World Wide Web How to program, P.J. Deitel & H.M. Deitel. Pearson.

SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR, CHHATTISGARH

FACULTY OF COMPUTER SCIENCE & ENGINEERING

B.Sc(CS & IT) Third Semester

Course Title	**DATA STRUCTURE**				
Course Code	**SBS04303**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites	Know the classifications of data structures, i.e., linear and non-linear understand the basic operations onlinear and non- linear data structures;				
Course Objectives	• Define the term ‘data structure’; • Explain the memory representation of all types of data structures • Explain how to implement the all kinds of data structures.				
Course Contents	**UNIT- I** Introduction: Basic Terminology, Elementary Data Organization, Algorithm, Efficiency of an Algorithm, Time and Space Complexity, Asymptotic notations: Big-Oh, Time-Space trade-off. Abstract Data Types (ADT) Arrays: Definition, Single and Multidimensional Arrays, Representation of Arrays: Row Major Order, and Column Major Order, Application of arrays. **UNIT-II** Stacks: Abstract Data Type, Primitive Stack operations: Push & Pop, Array and Linked Implementation of Stack in C, Application of stack: Prefix and Postfix Expressions, Evaluation of postfix expression, Recursion, Tower of Hanoi Problem, Simulating Recursion, Principles of recursion, Tail recursion, Removal of recursion Queues, Operations on. **UNIT- III** Trees: Basic terminology, Binary Trees, Binary Tree Representation: Array Representation and Dynamic Representation, Complete Binary Tree, Algebraic Expressions, Extended Binary Trees, Array and Linked Representation of Binary trees, Tree Traversal algorithms: Inorder, Preorder and Postorder, Threaded Binary trees, Traversing Threaded Binary trees, Huffman algorithm. **UNIT-IV** Graphs: Terminology, Sequential and linked Representations of Graphs: Adjacency Matrices, Adjacency List, Adjacency Multi list, Graph Traversal : Depth First Search and Breadth First Search, Connected Component,				

	Spanning Trees, Minimum Cost Spanning Trees. **UNIT-V** Searching : Sequential search, Binary Search, Comparison and Analysis Internal Sorting: Insertion Sort, Selection, Bubble Sort, Quick Sort, Two Way Merge Sort, Heap Sort, Radix Sort, Practical consideration for Internal Sorting. Search Trees: Binary Search Trees(BST), Insertion and Deletion in BST.
Course Outcomes	• Understand the concept of Dynamic memory management, data types, algorithms, Big O notation. • Understand basic data structures such as arrays, linked lists, stacks and queues. • Solve problem involving graphs, trees and heaps. • Have a comprehensive knowledge of the data structures and algorithms on which file structures and data bases are based. • Understand the importance of data and be able to identify the data requirements for an application. • Have in depth understanding and practical experience of algorithmic design and implementation.
Text Books	1. Aaron M. Tenenbaum, YedidyahLangsam and Moshe J. Augenstein “Data Structures Using C and C/C++” , PHI 2. Horowitz and Sahani, “Fundamentals of Data Structures”, Galgotia Publication
Reference Books	1. R. Kruse etal, “Data Structures and Program Design in C”, Pearson Education 2. Lipschutz, “Data Structures” Schaum’s Outline Series, TMH 3. G A V Pai, “Data Structures and Algorithms”, TMH

SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR, CHHATTISGARH

FACULTY OF COMPUTER SCIENCE & ENGINEERING

B.Sc(CS & IT) Third Semester

Course Title	**PROGRAMMING IN JAVA**				
Course Code	**SBS04304**				
Course Credits	**L**	**T**	**P**	**TC**	
	3	**1**	**-**	**4**	
Prerequisites	Basic knowledge of Java programming.				
Course Objectives	1. To understand the basic concepts and fundamentals of platform independent object oriented language. 2. To demonstrate skills in writing programs using exception handling techniques and multithreading. 3. To understand streams and efficient user interface design techniques.				
Course Contents	**UNIT – I** Introduction:Genesis of java, importance to the Internet, overview of features. OOP: OOP features, data types, control structures, arrays, methods and classes, nested & inner classes,string and String Buffer class, Wrapper Class, vectors. **UNIT-II** Inheritance: Basics type, method Override, using abstract and final classes, using super. Packages and Interfaces: Defined CLASSPATH, importing packages, implementing interface. **UNIT - III** Exception Handling: Fundamental: exception types, using try and catch, throwing exceptions, defined exceptions. Multithreaded Programming: Java spread model, creating threads, and thread priorities,synchronization. Suspending resuming and stopping threads. **UNIT –IV** Input/Output: Basic Streams, Byte and Character Stream, predefined streams, reading and writing from console and files. Using standard Java Packages(lang, util, io) Networking: Nasecs. TCP/IP client &server sockets, URL connection. JDBC: Setting the JDBC connectivity with back end database. **UNIT-V** Applets: Fundamentals, life cycle, overriding update, HTML APPLET tag, passing parameters. Developing single applets. Introduction to AWT: Window fundamentals, creating windowed, programs waking with graphics,using AWT controls, menus. Delegation event model, handling mouse and keyboard events.				

Course Outcomes	After successful completion of the course, the students are able to 1. Use the syntax and semantics of java programming language and basic concepts of OOP. 2. Develop reusable programs using the concepts of inheritance, polymorphism, interfaces and packages. 3. Apply the concepts of Multithreading and Exception handling to develop efficient and error free codes. 4. Design event driven GUI and web related applications which mimic the real word scenarios.
Text Books	1. java complete reference - by Patrick naughten&MesutScpddt. [TMH] 2. Java Primer - by E.Balaguruswami. 3. Johannes Gehrke, TATA McGraw Hill 3rd Edition. 4. Java Programming - Khalid Mughal
Reference Books	1. JAVA: The Complete Reference by Naughton&Schildt - Tata McGraw Hill,1999 2. An Introduction to Java Programming by Daniel Liang Y - , Prentice-Hall India, 1999

SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR, CHHATTISGARH

FACULTY OF COMPUTER SCIENCE & ENGINEERING

B.Sc(CS & IT) Third Semester

Course Title	**DATA STRUCTURES LAB**				
Course Code	**SBS04391**				
Course Credits	**L**	**T**	**P**	**TC**	
	-	**-**	**4**	**2**	
Prerequisites	Know the classifications of data structures, i.e., linear and non-linear understand the basic operations onlinear and non- linear data structures;				
Course Objectives	• Explain the memory representation of all types of data structures • Explain how to implement the all kinds of data structures.				
Course Contents	**List of Experiments:** 1. Write a program to perform following operations in one dimensional array, Insertion, Deletion and Searching (Linear & Binary). 2. Write a program to implement stack and perform push and pop operations. 3. Write a program to convert infix to postfix expressions using stack. 4. Write a program to perform following operations on a linear queue - addition, deletion, traversing. 5. Write a program to perform following operations on a circular queue - addition, deletion, traversing. 6. Write a program to perform following operations on a double ended queue - addition, deletion, traversing. 7. Write a program to perform following operations on a single link list-creation, inversion, deletion. 8. Write a program to perform following operations on a double link list – creation, insertion, deletion. 9. Write a program to implement polynomial in link list and perform. a. Polynomial arithmetic b) Evaluation of polynomial 10. Write a program to implement a linked stack and linked queue. 11. Write programs to perform Insertion, selection and bubble sort. 12. Write a program to perform quick sort. 13. Write a program to perform merge sort. 14. Write a program to perform heap sort. 15. Write a program to create a Binary search tree and perform –insertion, deletion & traversal.				

Course Outcomes	1. Have a comprehensive knowledge of the data structures and algorithms on which file structures and data bases are based.
Text Books	1. “Data structure using C” by Samir kumarBandyopadhyay, KashiNathDey 2. “C and Data structures” by Ashok K Kamthane Pearson Education. 3. “An Introduction to Data Structures with Application” by Tremblay & Sorenson (TMH)
Reference Books	1. “Fundamentals of Data Structure” by Horowitz &Sahni (Golgotia) 2. “Data Structures using C/C++” by Rajesh Shukla, Wiley India 3. “Data Structures using C” by ISRD Group (TMH) 4. “Data Structures using C/C++” by Langsam, Augenstein&Tananbaum (PHI) 5. “Data Structures & Program Design” by Robert L Kruse (PHI)

SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR, CHHATTISGARH

FACULTY OF COMPUTER SCIENCE & ENGINEERING

B.Sc(CS & IT) Third Semester

<table>
<tr><td>Course Title</td><td colspan="5">PROGRAMMING IN JAVA LAB</td></tr>
<tr><td>Course Code</td><td colspan="5">SBS04392</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>TC</td><td></td></tr>
<tr><td>-</td><td>-</td><td>4</td><td>2</td><td></td></tr>
<tr><td>Prerequisites</td><td colspan="5">Basic knowledge about Java Programming.</td></tr>
<tr><td>Course Objectives</td><td colspan="5">1. Student should be able to understand the basic knowledge of Java Programming and its Structure.</td></tr>
<tr><td>Course Contents</td><td colspan="5">LIST OF EXPERIMENTS:-
1. Write a Java Program find the Area of circle using command-line arguments.
2. Write a Java Program that will display Factorial of the given number.
3. Write a Java Program that will display 25 Prime nos.
4. Write a Java Program to sort the elements of an array in ascending order.
5. Write a Java Program which will read a word and count all occurrences of a particular character.
6. Write a Java Program which will read a string and rewrite it in the alphabetical ordereg.The word “STRING” should be written a “GINRST”.
7. Write a java program which shows the application of constructors and constructors overloading.
8. Write a java program which shows the use of methods overloading.
9. Write a java program which shows the use of static members and methods.
10. Write a java program which shows the nesting of methods.
11. Write a java program which shows use of String & StringBuffer class.
12. Write a java program which shows use of Vector class.
13. Write a java program for DataInputStream which use try and catch for exception handling.
14. Write a java program which use multiple catch blocks and also define finally block.
15. Write a java program which shows throwing our own exception.</td></tr>
<tr><td>Course Outcomes</td><td colspan="5">1. After completion of this course the students will be able to apply their basic knowledge of Java programming.</td></tr>
</table>

Text Books	1. Teach Yourself JAVA by Joseph O'Neil & Herb Schildt - McGraw-Hill Edition 2. JAVA: The Complete Reference by Naughton&Schildt - Tata McGraw Hill,1999
Reference Books	1. Johannes Gehrke, TATA McGraw Hill 3rd Edition. 2. An Introduction to Java Programming by Daniel Liang Y - , Prentice-Hall India, 1999

SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR, CHHATTISGARH

FACULTY OF COMPUTER SCIENCE & ENGINEERING

B.Sc(CS & IT) Third Semester

<table>
<tr><td>Course Title</td><td colspan="5">WEB TECHNOLOGY LAB</td></tr>
<tr><td>Course Code</td><td colspan="5">SBS04393</td></tr>
<tr><td rowspan="2">Course Credits</td><td>L</td><td>T</td><td>P</td><td>TC</td><td></td></tr>
<tr><td>-</td><td>-</td><td>4</td><td>2</td><td></td></tr>
<tr><td>Prerequisites</td><td colspan="5">Basic knowledge about computer fundamental & html basic.</td></tr>
<tr><td>Course Objectives</td><td colspan="5">1. To understand the basics of a Computer.
2. To learn basics of network and internet.
3. Demonstrate techniques for improving the accessibility of an HTML document.</td></tr>
<tr><td>Course Contents</td><td colspan="5">List of Experiments:
(At least Ten experiments are to be performed by each student)
Practical Set -1 HTML
1. Design web pages for your college containing a description of the courses, departments, faculties, library etc, use href, list tags.
2. Create your class timetable using table tag.
3. Create user Student feedback form (use textbox, text area , checkbox, radio button, select box etc.)
4. 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.
5. Write html code to develop a webpage having two frames that divide the webpage into two equal rows and then divide the row into equal columns fill each frame with a different background color.
6. Create your resume using HTML tags also experiment with colors, text , link , size and also other tags you studied.
Practical Set -2 CSS
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 created.
9. Use External CSS to format your class timetable as you created.</td></tr>
</table>

	10. Use External, Internal, and Inline CSS to format college web page that you created. **Practical Set -3 CSS** 11. Develop a JavaScript to display today's date. 12. Develop simple calculator for addition, subtraction, multiplication and division operation using JavaScript 13. Create HTML Page with JavaScript which takes Integer number as input and tells whether the number is ODD or EVEN. 14. Create HTML Page that contains form with fields Name, Email, Mobile No , Gender , Favorite Color and a button now write a JavaScript code to combine and display the information in textbox when the button is clicked. 15. Implement Validation in above Feedback Form. 16. Use regular expression for validation in Feedback Form 17. Using ajax retrieve data from a TXT file and display it. **Practical Set -4 CSS** 18. Create XML file to store student information like Enrollment Number, Name , Mobile Number , Email Id. 19. Create DTD for above XML File. 20. Create XML Schema for above (Practical No. 17) 21. Create XSL file to convert above (refer Practical No. 17) XML file into XHTML file. **Practical Set -5 PHP** 22. Write a php program to display today's date in dd-mm-yyyy format. 23. Write a php program to check if number is prime or not. 24. Write a php program to print first 10 Fibonacci Numbers. 25. Create HTML page that contain textbox, submit / reset button. Write php program to display this information and also store into text file. 26. Write a php script to read data from txt file and display it in html table (the file contains info in format Name: Password: Email) 27. Write a PHP Script for login authentication. Design an html form which takes username and password from user and validate against stored username and password in file. 28. Write PHP Script for storing and retrieving user information from MySql table. 1. Design A HTML page which takes Name, Address, Email and Mobile No. From user (register.php) 2. Store this data in Mysql database / text file. 3. Next page display all user in html table using PHP (display.php) 29. Write a PHP script for user authentication using PHP-MYSQL. Use session for storing username. 30. Using ajax fetch information from a database with AJAX.
Course Outcomes up	1. To design web sites utilizing multiple tools and techniques. 2. To demonstrate the ability to create dynamic pages that are easy to navigate and easy to date.

Text Books	1. HTML Complete Reference- Tata McGraw hill. 2. HTML and XML: An Introduction NIIT, Prentice-Hall of India. 3. Building Enhanced HTML Help with DHTML and CSS by Jeannine M. E. Klien. Pearson Education.
Reference Books	1. HTML for the World Wide Web, Fifth Edition, with XHTML and CSS. 2. Visual Quick Start Guide 5th Edition Elizabeth Castro, Pearson Education Sams Teach Yourself HTML & XHTML in 24 Hours 6th Edition Dick Oliver, Michael Morrison, Pearson Education.