Shri Rawatpura SarkarUniversity, Raipur

Examination Syllabus

For

Diploma

In

Computer Science Engineering

Semester-IV

(Effective from the session: 2022-23)

SHRI RAWATPURA SARKAR UNIVERSITY, RAIPUR, CHHATTISGARH

FACULTY OF ENGINEERING

Three Years Diploma Programme

Scheme of Teaching and Examination

Diploma in Computer Science Engineering

Semester - IV

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			Credit	Maximum Marks			Sem End Exam Duration (Hrs)
			L	**T**	**P**		Continuous Evaluation	Sem End Exam	Total	
1	EDP04401	Computer Architecture	3	1	-	4	30	70	100	3 Hrs.
2	EDP04402	Data Structure	3	1	-	4	30	70	100	3 Hrs.
3	EDP04403	Linux Operating System	3	1	-	4	30	70	100	3 Hrs.
4	EDP04404	Programming in Java	3	1	-	4	30	70	100	3 Hrs.
5	EDP04405	Web design and Programming	3	1	-	4	30	70	100	3 Hrs.
6	EDP04491	Data Structure Lab	-	-	2	1	15	35	50	3 Hrs.
7	EDP04392	Programming in Java Lab	-	-	2	1	15	35	50	3 Hrs.
8	EDP04393	Web design and Programming Lab	-	-	2	1	15	35	50	3 Hrs.
Total Contact hr. per week: 26			**Total Credit: 23**				Data Structure Lab		**650**	

Diploma in Engineering (Computer Science Engineering)
Semester - IV
2022-23

<table>
<tr><td>Course Title</td><td colspan="5">COMPUTER ARCHITECTURE</td></tr>
<tr><td>Course Code</td><td colspan="5">EDP04401</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">The students will be able to understand the architecture and maintenance of computer system.</td></tr>
<tr><td>Course Objectives</td><td colspan="5">• To develop the basic insight in student about the change in the hardware technology, technology design and thereby develop better knowledge for the maintenance and repairing of the computer system.</td></tr>
<tr><td>Course Contents</td><td colspan="5">UNIT I
BASIC STRUCTURE OF A COMPUTER SYSTEM: Functional Units – Basic Operational Concepts – Performance – Instructions: Language of the Computer – Operations, Operands – Instruction representation – Logical operations – decision making – MIPS Addressing.
UNIT II
ARITHMETIC FOR COMPUTERS: Addition and Subtraction – Multiplication – Division – Floating Point Representation – Floating Point Operations – Subword Parallelism.
UNIT III
PROCESSOR AND CONTROL UNIT: A Basic MIPS implementation – Building a Datapath – Control Implementation Scheme – Pipelining – Pipelined datapath and control – Handling Data Hazards & Control Hazards – Exceptions.
UNIT IV
PARALLELISIM: Parallel processing challenges – Flynn’s classification – SISD, MIMD, SIMD, SPMD, and Vector Architectures - Hardware multithreading – Multi-core processors and other Shared Memory Multiprocessors - Introduction to Graphics Processing Units, Clusters, Warehouse Scale Computers and other Message-Passing Multiprocessors.
UNIT V
MEMORY & I/O SYSTEMS: Memory Hierarchy - memory technologies – cache memory – measuring and improving cache performance – virtual memory, TLB’s – Accessing I/O Devices – Interrupts – Direct Memory Access – Bus structure – Bus operation – Arbitration – Interface circuits - USB.</td></tr>
<tr><td>Course Outcomes</td><td colspan="5">• Students will be able to learn how to plan for establishing a computer set-up for any given requirement.</td></tr>
</table>

	• Students will be familiar with hardware developmental, processor and control design of computer systems.
Text Books	1. Computer Architecture and Organization J.P.Hayes,Tata McGraw Hills Publishing Co.l Ltd., New. Delhi 2. IBM PC and Clones B.Govindrajulu,Tata McGraw Hill Publications New Delhi 3. Inside IBM PC Peter Norton,Prentice Hall of India Pvt.Ltd , New Delhi IV th - Edition1999
Reference Books	1. Structured computer Organization Andrews TanenbaumPrentice Hall of India Pvt.Ltd, New Delhi III rd- Edition 1997. 2. Electronic fault diagnosis G.C.Loveday, Longman Scientifi& Technical , IIIr 6. Upgrading and repairing PCs Scott Mueller, QUE Publication

Diploma in Engineering (Computer Science Engineering)
Semester - IV
2022-23

<table>
<tr><td>Course Title</td><td colspan="5">DATA STRUCTURE</td></tr>
<tr><td>Course Code</td><td colspan="5">EDP04402</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">To develop logic & structured programs.</td></tr>
<tr><td>Course Objectives</td><td colspan="5">• The study of data structure is an essential part of computer science.</td></tr>
<tr><td>Course Contents</td><td colspan="5">UNIT I
Time and space complexity, Data Structures – Introduction to Data Structures, abstract data types, Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, circular linked list implementation, Double linked list implementation, insertion, deletion and searching operations. Applications of linked lists.
UNIT II
STACKS
Stacks-Operations, array and linked representations of stacks, stack applications -infix to postfix conversion, postfix expression evaluation, recursion implementation.
UNIT III
QUEUES
Queues-operations, array and linked representations. Circular Queue operations, Dequeues, applications of queues.
UNIT IV
Searching and Sorting – Sorting- selection sort, bubble sort, insertion sort, quick sort, merge sort, shell sort, radix sort, Searching-linear and binary search methods, comparison of sorting and searching methods.
UNIT V
Trees – Definitions, tree representation, properties of trees, Binary tree, Binary tree representation, binary tree properties, binary tree traversals, binary tree implementation, applications of trees.</td></tr>
<tr><td>Course Outcomes</td><td colspan="5">• Students will be familiar with Data Structure, definition, initialization, storage, operations & applications.
• Will be able to implement methods of data structure C which is found to be appropriate language.</td></tr>
</table>

Text Books	1. Data Structure Using C++ Tenenbaum, PHI 2. Data structures, Algorithms and OOPs Gregory Heilman Mc-Graw Hills
Reference Books	1. Data Structure Using C lab workbook Shukla BPB Publication 2. Teach Yourself data Structure and Algorithms in 24 Hrs. RobortLafore BPB 3. Data structure and algorithm Seymour Lipsuitz, schaum series.

Diploma in Engineering (Computer Science Engineering)
Semester - IV
2022-23

<table>
<tr><td>Course Title</td><td colspan="5">Linux Operating System</td></tr>
<tr><td>Course Code</td><td colspan="5">EDP04403</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">This course explains the fundamental ideas behind the open source operating system approach to programming. Knowledge of Linux helps to understand OS level programming.</td></tr>
<tr><td>Course Objectives</td><td colspan="5">• To teach principles of operating system including File handling utilities, Security by file permissions, Process utilities, Disk utilities, Networking Commands, Basic Linux commands, Scripts and filters. To familiarize fundamentals of the Bourne again shell (bash), shell programming, pipes, input and output redirection Control structures, arithmetic in shell interrupt processing, functions, debugging shell scripts. To impart fundamentals of file concepts kernel support for file, File structure related system calls (file API’s).</td></tr>
<tr><td>Course Contents</td><td colspan="5">UNIT I
INTRODUCTION TO LINUX AND LINUX UTILITIES: A brief history of LINUX, architecture of LINUX, features of LINUX, introduction to vi editor. Linux commands- PATH, man, echo, printf, script, passwd, uname, who, date, stty, pwd, cd, mkdir, rmdir, ls, cp, mv, rm, cat, more, wc, lp, od, tar, gzip, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger, arp, ftp, telnet, rlogin.Text Processing utilities and backup utilities , tail, head , sort, nl, uniq, grep, egrep, fgrep, cut, paste, join, tee, pg, comm, cmp, diff, tr, awk, cpio
UNIT II
Introduction to Shells: Linux Session, Standard Streams, Redirection, Pipes, Tee Command, Command Execution, Command-Line Editing, Quotes, Command Substitution, Job Control, Aliases, Variables, Predefined Variables, Options, Shell/Environment Customization. Filters: Filters and Pipes, Concatenating files, Display Beginning and End of files, Cut and Paste, Sorting, Translating Characters, Files with Duplicate Lines, Count Characters, Words or Lines, Comparing Files.
UNIT III
Grep: Operation, grep Family, Searching for File Content. Sed :Scripts, Operation, Addresses, commands, Applications, grep and sed.</td></tr>
</table>

	UNIX FILE STRUCTURE: Introduction to UNIX file system, inode (Index Node), file descriptors, system calls and device drivers. **File Management :**File Structures, System Calls for File Management – create, open, close, read, write, lseek, link, symlink, unlink, stat, fstat, lstat, chmod, chown, Directory API – opendir, readdir, closedir, mkdir, rmdir, umask. **UNIT IV** **PROCESS AND SIGNALS:** Process, process identifiers, process structure: process table, viewing processes, system processes, process scheduling, starting new processes: waiting for a process, zombie processes, orphan process, fork, vfork, exit, wait, waitpid, exec, signals functions, unreliable signals, interrupted system calls, kill, raise, alarm, pause, abort, system, sleep functions, signal sets. File locking: creating lock files, locking regions, use of read and write with locking, competing locks, other lock commands, deadlocks. **UNIT V** **INTER PROCESS COMMUNICATION:** Pipe, process pipes, the pipe call, parent and child processes, and named pipes: fifos, semaphores: semget, semop, semctl, message queues: msgget, msgsnd, msgrcv, msgctl, shared memory: shmget, shmat, shmdt, shmctl, ipc status commands. **INTRODUCTION TO SOCKETS:** Socket, socket connections - socket attributes, socket addresses, socket, connect, bind, listen, accept, socket communications.
Course Outcomes	• 1. Ability to use various Linux commands that are used to manipulate system operations at admin level and a prerequisite to pursue job as a Network administrator. • 2. Ability to write Shell Programming using Linux commands. • 3. Ability to design and write application to manipulate internal kernel level Linux File System
Text Book	1. W. Richard. Stevens (2005), Advanced Programming in the UNIX Environment, 3rd edition, Pearson Education, New Delhi, India. 2. Unix and shell Programming Behrouz A. Forouzan, Richard F. Gilberg.Thomson

Diploma in Engineering (Computer Science Engineering)
Semester - IV
2022-23

<table>
<tr><td>Course Title</td><td colspan="5">Programming in Java</td></tr>
<tr><td>Course Code</td><td colspan="5">EDP04404</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">This course explains the fundamental ideas behind the object oriented approach to programming. Knowledge of java helps to create the latest innovations in programming.</td></tr>
<tr><td>Course Objectives</td><td colspan="5">• To teach principles of object oriented programming paradigm including abstraction, encapsulation, inheritance and polymorphism. To impart fundamentals of object-oriented programming in Java, including defining classes, invoking methods, using class libraries, etc. To inculcate concepts of inheritance to create new classes from existing one & Design the classes needed given a problem specification.</td></tr>
<tr><td>Course Contents</td><td colspan="5">UNIT I
JAVA BASICS: Review of Object oriented concepts, History of Java, Java buzzwords, JVM architecture, Data types, Variables, Scope and life time of variables, arrays, operators, control statements, type conversion and casting, simple java program, constructors, methods, Static block, Static Data, Static Method String and String Buffer Classes, Using Java API Document.
UNIT II
INHERITANCE AND POLYMORPHISM: Basic concepts, Types of inheritance, Member access rules, Usage of this and Super key word, Method Overloading, Method overriding, Abstract classes, Dynamic method dispatch, Usage of final keyword. PACKAGES AND INTERFACES: Defining package, Access protection, importing packages, Defining and Implementing interfaces, and Extending interfaces. I / O STREAMS: Concepts of streams, Stream classes- Byte and Character stream, Reading console Input and Writing Console output, File Handling.
UNIT III
EXCEPTION HANDLING: Exception types, Usage of Try, Catch, Throw, Throws and Finally keywords, Built-in Exceptions, Creating own Exception classes.MULTI THREADING: Concepts of Thread, Thread life cycle, creating threads using Thread class and Runnable interface, Synchronization, Thread priorities, Inter Thread communication.</td></tr>
</table>

	UNIT IV AWT CONTROLS: The AWT class hierarchy, user interface components-Labels, Button, Text Components, Check Box, Check Box Group, Choice, List Box, Panels – Scroll Pane, Menu, Scroll Bar. Working with Frame class, Colour, Fonts and layout managers. EVENT HANDLING: Events, Event sources, Event Listeners, Event Delegation Model (EDM), Handling Mouse and Keyboard Events, Adapter classes, Inner classes. **UNIT V** SWINGS: Introduction to Swings, Hierarchy of swing components. Containers, Top level containers - JFrame, JWindow, JDialog, JPanel, JButton, JToggleButton, JCheckBox, JRadioButton, JLabel,JTextField, JTextArea, JList, JComboBox, JScrollPane.APPLETS: Life cycle of an Applet, Differences between Applets and Applications, Developing applets, simple applet.
Course Outcomes	• Analyze the necessity for Object Oriented Programming paradigm over structured programming and become familiar with the fundamental concepts in OOP like encapsulation, Inheritance and Polymorphism. Design and develop java programs, analyze, and interpret object oriented data and report results. Design an object oriented system, AWT components and multithreaded processes as per needs and specifications.
Text Books	Herbert schildt (2010), The complete reference, 7th edition, Tata Mc graw Hill, New Delhi.
Reference Books	1. Head First Java, O'rielly publications 2. T. Budd (2009), An Introduction to Object Oriented Programming, 3rd edition, PearsonEducation, India. 3. J. Nino, F. A. Hosch (2002), An Introduction to programming and OO design using Java, John Wiley & sons, New Jersey

Diploma in Engineering (Computer Science Engineering)
Semester - IV
2022-23

<table>
<tr><td>Course Title</td><td colspan="5">Web design and Programming</td></tr>
<tr><td>Course Code</td><td colspan="5">EDP04405</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">Basics of HTML and CSS</td></tr>
<tr><td>Course Objectives</td><td colspan="5">• To impart core theoretical and practical knowledge of Graphics and Web Designing for leading successful career in industries, pursuing higher studies or entrepreneurial endeavours.</td></tr>
<tr><td>Course Contents</td><td colspan="5">UNIT I
Introduction to WWW: Protocols and programs, secureconnections, application and development tools, the webbrowser. Web site design principles, planning the siteand navigation. Web Essentials: Clients, Servers, and Communication. The Internet-Basic Internet Protocols. The WorldWide Web-HTTP request message-response message-Web Clients, What is server, choices, setting up servers, Logging users, dynamic IP. Understanding hyperlinks, URLS, Domain names. Concepts of web hosting. Introduction to Web servers- Windows based/Linux based. Introduction to W3C Standards.
UNIT II
Types of Websites: Static and Dynamic websites, Ideas about Open Source, Creative Commons, world wide web-based philanthropic projects Web Design: Concepts of effective web design, Web design issues including Browser, Bandwidth and Cache, Display resolution, Look and Feel of the Website, Page Layout and linking, User centric design, Sitemap, Planning and publishing website, Designing effective navigation.
UNIT III
Introduction to database- MySQL, Introduction to server-side scripting language- PHP, Introduction to Client -side scripting- Javascript, Understanding how MySQL and PHP works together tocreate a dynamic website, Integrating XML,DHTML Understanding content management system (CMS): Introduction to open source CMS- Joomla, Concepts of Categories and Articles, Concepts of Modules, components and plugins.
UNIT IV
Blog Interface: What are blogs, The most popular blog engines- Word press and Blogger, Introduction to the blog interface dashboard, Categories, tags,</td></tr>
</table>

	permalinks and shortlinks. **UNIT V** Search Engine Optimization: Introduction to SEO, Search Engines- how search engines work, Black Hat vs White Hat SEO, Best SEO practices, Keywords, How to write web content, Parameters/standard of good SEO.
Course Outcomes	• Know about the basic functioning of WWW and websites • Learn various WWW concepts
Text Books	• Web Technologies, Uttam K Roy, Oxford University Press • The Complete Reference PHP – Steven Holzner, Tata McGraw-Hill
Reference Books	1. Developing Web Applications, Ralph Moseley and M. T. Savaliya, Wiley-India 2. Steven Holzner,"HTML Black Book", Dremtech press.

Diploma in Engineering (Computer Science Engineering)
Semester - IV
2022-23

<table>
<tr><td>Course Title</td><td colspan="5">DATA STRUCTURE LAB</td></tr>
<tr><td>Course Code</td><td colspan="5">EDP04491</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>2</td><td>2</td><td></td></tr>
<tr><td>Prerequisites</td><td colspan="5">Understand and remember algorithms and its analysis procedure.</td></tr>
<tr><td>Course Objectives</td><td colspan="5">• To design and implement various data structure algorithms.
• To introduce various techniques for representation of the data in the real world.
• To develop application using data structure algorithms.
• Compute the complexity of various algorithms.</td></tr>
<tr><td>Course Contents</td><td colspan="5">LIST OF PRACTICALS/ TUTORIALS:
▪ Program to search an element of array sing linaer search.
▪ Program to reverse the element of array.
▪ Insertion and deletion on array at specified position.
▪ Program for Matrices operation-
▪ Transpose
▪ Multiplication
▪ Addition
▪ Adjoint
▪ Inverse
▪ Program to concatenate two strings using array.
▪ Program based on structure union.
▪ Program to implement PUSH and POP operation on stack.
▪ One program based on
- In fix to post fix or infix to prefix using stack concept
- Recursion using stack.
▪ Program based on queue & their operations for an application.
▪ Program for implementation of circular queue.</td></tr>
</table>

	▪ Program based on list operations and its application. ▪ Program based on pointers in C. ▪ Implementation of tree using linked list. ▪ Implementation of different types of sorting techniques. ▪ Implementation of Binary search Algorithm using Binary tree ▪ Assignment based on graph theory.
Course Outcomes	• Select appropriate data structures as applied to specified problem definition. • Implement operations like searching, insertion, and deletion, traversing mechanism etc. on various data structures. • Students will be able to implement linear and Non-Linear data structures. • Implement appropriate sorting/searching technique for given problem. • Design advance data structure using Non - Linear data structure. • Determine and analyze the complexity of given Algorithms.
Text Books	1. Data Structure Using C++ Tenenbaum, PHI 2. Data structures, Algorithms and OOPs Gregory Heilman Mc-Graw Hills 3. Data Structure Using C lab workbook Shukla BPB Publication
Reference Books	1. Teach Yourself data Structure and Algorithms in 24 Hrs. RobortLafore BPB Publication 2. Data structure and algorithm Seymour Lipsuitz, schaum series 3. Pointers in C Kanitkar , BPB publication

Diploma in Engineering(Computer Science Engineering)
Semester - IV
2022-23

<table>
<tr><td>Course Title</td><td colspan="5">Programming in Java Lab</td></tr>
<tr><td>Course Code</td><td colspan="5">EDP04392</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>2</td><td>2</td><td></td></tr>
<tr><td>Prerequisites</td><td colspan="5">Basic knowledge about java and OOP concepts.</td></tr>
<tr><td>Course Objectives</td><td colspan="5">• Make them learn about Java programming concepts, graphical user interfaces, basic data structures.</td></tr>
<tr><td>Course Contents</td><td colspan="5">EXPERIMENT LIST:
1. a) Program for printing Hello World.
b) Program for Printing System Date & Time JSP/SERVLET:
2. Program: For Telephone DirectoryIn this example we will use getParameter() method of the request object for processing the telephone number , Here we would accept telephoneno. from front end request is get done processed in server side and corresponding telephone no of entered user is displayed on screen as output.
3. Write a server side program for Finding Factorial of number.
4. Write a Server side program in JSP/SERVLET for performing Addition of two no accept numbers from client side by using HTML form.
5. Write a Server side program in JSP/SERVLET for calculating the simple interest accept the necessary parameters from client side by using
HTML form.
6.Write a Server side program in JSP/SERVLET for solving Quadratic Equation accept necessary parameters from HTML form.
7. Write a Server side program in JSP/SERVLET for Income Tax Calculation
8. Write a Server side program in JSP/SERVLET for Calculation of Sales Commission.
9. Program:Write a server side JSP/SERVLET program for checking prime number, accept number from html file handover the no toJSP/Servlet file process it and return the result.
10. Install a database (MySQL or Oracle). Create a table which should contain at least the following fields: name, password, email-id,</td></tr>
</table>

	phonenumber (these should hold the data from the registration form). Practice 'JDBC' connectivity. 11. Write a java program/servlet/JSP/SERVLET toconnect to that database and extract data from the tables and display them. Experiment with various SQL queries. Insert the details of the userswho register with the web site, whenever a new user clicks the submit button in the registration page.
Course Outcomes	• Can develop solutions for a range of problems using object-oriented programming. • Be able to implement, compile, test and run Java programs comprising more than one class, to address a particular software problem. • Demonstrate the ability to use simple data structures like arrays in a Java program.
Text Books	1. Introduction to Java Programming: Liang, Pearson Education, 7th Edition. 2. Java The complete reference: Herbert Schildt, TMH, 5th Edition.
Reference Books	1. Balguruswamy, Programming with JAVA, TMH. 2. Programming with Java*:* Bhave&. Patekar, Pearson Education.

Diploma in Engineering (Computer Science Engineering)
Semester - IV
2022-23

Course Title	**Web design and Programming Lab**				
Course Code	**EDP04393**				
Course Credits	**L**	**T**	**P**	**TC**	
	-	**-**	**2**	**2**	
Prerequisites	Basic knowledge in HTML tags & skill of creating web pages should be known.				
Course Objectives	• Define the principle of Web page design • Define the basics in web design • Visualize the basic concept of HTML				
Course Contents	**EXPERIMENT LIST:** Basic principles involved in developing a web site Planning process Five Golden rules of web designing Designing navigation bar Brief History of Internet What is World Wide Web How to create a web site What is HTML HTML Documents Basic structure of an HTML document Creating an HTML document Mark up Tags Heading-Paragraphs Line Breaks HTML Tags. Concept of CSS Creating Style Sheet CSS Properties				

	CSS Styling(Background, Text Format, Controlling Fonts) Working with block elements and objects Working with Lists and Tables CSS Id and Class Box Model(Introduction, Border properties, Padding Properties, Margin properties) CSS Advanced(Grouping, Dimension, Display, Positioning, Floating, Align,Pseudo class, Navigation Bar, Image Sprites, Attribute sector) CSS Color Creating page Layout and Site Designs.
Course Outcomes	• Students will understand the knowhow and can function either as an entrepreneur or can take up jobs in the multimedia and Web site development studio and other information technology sectors.
Text Books	1. Introduction to Web Programming: Liang, Pearson Education, 7th Edition.
Reference Books	Balguruswamy, Web Programming, TMH.