Chhattisgarh Swami Vivekanand Technical University, Bhilai

Scheme of Teaching and Examination

BE (Information Technology) IV Semester

Sl. No.	Board of Studies (BOS)	Courses (Subject)	Subject Code	Period per Week			Scheme of Examination			Total Marks	Credits
				L	T	P	Theory/Lab				
							ESE	CT	TA		
1	Information Technology	Data Structures	**B033411(033)**	3	1	-	100	20	30	150	4
2	Information Technology	Database Management System	**B033412(033)**	3	1	-	100	20	30	150	4
3	Information Technology	Analog Electronic Circuits	**B033413(033)**	3	1	-	100	20	30	150	4
4	Information Technology	Operating System	**B033414(033)**	2	1	-	100	20	30	150	3
5	Information Technology	Internet of Things	**B033415(033)**	2	0	-	100	20	30	150	2
6	Information Technology	Data Structures Lab	**B033421(033)**	-	-	2	40	-	20	60	1
7	Information Technology	Database Management System Lab	**B033422(033)**	-	-	2	40	-	20	60	1
8	Information Technology	Operating System (UNIX) Lab	**B033423(033)**	-	-	2	40	-	20	60	1
9	Information Technology	Virtual Lab (IoT Lab)	**B033424(033)**	-	-	2	40	-	20	60	1
10	Humanities	Traditions, Culture & Constitution of India	**B000406(046)**	-	-	2	-	-	10	10	-
		Total Marks		**13**	**4**	**10**	**660**	**100**	**240**	**1000**	**21**

Note:

1. **Duration of End Semester Exam of all theory papers will be of Three Hours.**
2. **Industrial Training of eight weeks is mandatory for B.E. student. It is to be completed in two parts.**
   - **The first part will be in summer after IV semester after which students have to submit a training report which will be evaluated by the college teachers during B.E. V semester.**

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Branch: Information Technology **Semester: IV**

Subject: Data Structures **Subject Code: B033411(033)**

Total Theory Periods: 40 **Total Tutorial Periods:10**

No. of Class tests to: 2(Minimum) **No. of Assignments to be submitted: One per Unit**

ESE Duration: Three Hours Maximum Marks in ESE:100 Minimum Marks in ESE:35

COURSE OBJECTIVES

1. Introduce data organization and fundamental concepts of Data Structures.
2. Introduce basic operations on linear and non-Linear data structures
3. Introduce searching, sorting techniques
4. Analyze performance of algorithms.
5. Learn how concepts of data structures are useful in problem solving.

COURSE OUTCOMES

After successful completion if this course, the students will be able to-

1. Distinguish between different types of data structures such as stacks, queues and linked lists and their application on real world problems.
2. Perform Comparative study of algorithms for searching and sorting and to select the best one on the basis of performance analysis of different algorithms for real world problems.
3. Identify and design algorithmic solutions for different real-world problems and then analyze them using different performance analysis parameters and techniques
4. Examine the different aspects of Binary Trees and make use of these concepts to efficiently allocate memory for Binary, AVL, B-tree, m-way search trees.
5. Illustrate techniques to fully depict Graphs and identify the optimum ways for arrangement of nodes.

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, Application of arrays, Sparse Matrices and their representations. Linked lists: Array Implementation and Dynamic Implementation of Singly Linked Lists, Doubly Linked List, Circularly Linked List, Operations on a Linked List. Insertion, Deletion, Traversal, Polynomial Representation and Addition .

Unit II: Stacks and Queues: 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, Operations on Queue: Create, Add, Delete, Full and Empty, Circular queues, Array and linked implementation of queues in C, Dequeue and Priority Queue.

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. Binary Search Trees (BST), Insertion and Deletion in BST, Complexity of Search Algorithm, AVL trees, Introduction to m-way Search Trees, B Trees & B+ Trees

Unit IV: Graphs

Terminologies, 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: Prims and Kruskal algorithm. Shortest Path algorithm: Warshal Algorithm and Dijikstra Algorithm.

Unit V: Searching and Sorting

Sequential search, Binary Search, Comparison and Analysis of Sorting: Insertion Sort, Selection, Bubble Sort, Quick Sort, Merge Sort, Heap Sort, Radix Sort, Hashing: Hash Function, Collision Resolution.

TEXT BOOKS

1. Fundamentals of Data Structures – Horowitz and Sahani, Galgotia Publication

REFERENCE BOOKS

1. Data Structures Using C and C++ – Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein, PHI Publications
2. An Introduction to Data Structures with applications – Jean Paul Trembley and Paul G. Sorenson, McGraw Hill Publications
3. Data Structures and Program Design in C – R. Kruse etal, , Pearson Education
4. Data Structures – Lipschutz, Schaum's Outline Series, TMH

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Branch: Information Technology **Semester: IV**

Subject: Database Management System **Subject Code: B033412(033)**

Total Theory Periods: 40 **Total Tutorial Periods:10**

No. of Class tests : 2 (Minimum) **No. of Assignments tobe submitted: One per Unit**

ESE Duration: Three Hours Maximum Marks in ESE:100 Minimum Marks in ESE:35

COURSE OBJECTIVE:

- To understand the role of a database management system and its users in an organization.
- To understand database concepts, including the structure and operation of the relational data model.
- To successfully apply logical database design principles, including E-R diagrams and database normalization.
- To construct simple and moderately advanced database queries using Structured Query Language (SQL).
- To understand the concept of transaction, its properties and how to persist the data in complex concurrent users environment.

COURSE OUTCOME:

- Will be able to describe the basic concepts of RDMBS and relational data model
- Be familiar with the relational database theory, and be able to write relational algebra expressions for queries.
- Understand DML, DDL and will be able to construct queries using SQL by knowing the importance of data & its requirements in any applications.
- Be familiar with the basic issues of transaction, its processing and concurrency control.
- Able to translate DB designs from relational notation to ER notation & con Perform normalization once redundancies have been eliminated.
- Be familiar with basic db storage structures, access techniques: file / page organizations, indexing methods including B-tree, hashing.

Unit-1

Introduction: An overview of database management system, database system Vs file system, Database system concept and architecture, data model schema and instances, data independence and database language and interfaces, Overall Database Structure.

Data Modeling using the Entity Relationship Model: ER model concepts, notation for ER diagram, mapping constraints, keys, Concepts of Super Key, candidate key, primary key, Generalization, aggregation, reduction of an ER diagrams to tables, extended ER model, relationship of higher degree.

Unit-2

Relational data Model and Language: Relational data model concepts, integrity constraints, entity integrity, referential integrity, Keys constraints, Domain constraints, relational algebra, relational calculus, tuple and domain calculus.

Introduction on SQL: Characteristics of SQL, advantage of SQL. SQl data type and literals. Types of SQL commands. SQL operators and their procedure. Tables, views and indexes. Queries

and sub queries. Aggregate functions. Insert, update and delete operations, Joins, Unions, Intersection, Minus, Cursors, Triggers, Procedures in SQL/PL SQL

Unit-3

Data Base Design & Normalization: Functional dependencies, normal forms, first, second, third normal forms, BCNF, inclusion dependence, loss less join decompositions, normalization using FD and MVD alternative approaches to database design.

Unit-4

Transaction Processing Concept: Transaction system, Testing of serializability, serializability of schedules, conflict & view serializable schedule, recoverability, Recovery from transaction failures, log based recovery, checkpoints, deadlock handling.

Unit-5

Concurrency Control Techniques: Concurrency control, Locking Techniques for concurrency control, Time stamping protocols for concurrency control, validation based protocol, multiple granularity, Multi version schemes, Recovery with concurrent transaction, case study of Oracle.

Overview of Storage and Indexing: Data on External Storage, File Organization and Indexing - Clustered Indexes, Primary and Secondary Indexes, Index data Structures - Hash Based Indexing, Tree based Indexing, Comparison of File Organizations, Indexed Sequential Access Methods(ISAM).

Text Books:

1. Database system concept, Korth & Sudarshan, TMH, 5th Ed.
2. Introduction to Database Systems, C.J.Date, Pearson Education, 8th Ed.

Reference Books

1. Principles of Database Systems", 2nd Edn., Ullman, J.O, Galgotia Publications.
2. Fundamentals of Database Systems, Elmasri R. & Navathe S.B., Pearson Education.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Branch: Information Technology **Semester: IV**

Subject: Analog Electronic Circuits **Subject Code: B033413(033)**

Total Theory Periods: 40 **Total Tutorial Periods:10**

No. of Class: 2(Minimum) **No. of Assignments to be submitted: One per Unit**

ESE Duration: Three Hours **Maximum Marks in ESE:100**
Minimum Marks in ESE: 35

Course Objectives:

1. To clearly understand and demonstrate the knowledge of semiconductor diode and transistors and its applications.
2. To clearly understand and demonstrate the knowledge of amplifiers at low frequencies.
3. To conceptualize the concepts of multistage amplifiers and their applications.
4. To understand the basics of feedback in amplifiers.
5. To gain a thorough understanding of oscillators, their applications and in the process gain substantial knowledge of system analysis & design as well as team work

Course outcomes:

1. To develop a clear understanding of semiconductor device and its applications.
2. To develop a clear understanding of transistor as an amplifier.
3. To understand the working of amplifiers at low frequencies and study about the hybrid model.
4. To know about the different amplifier configurations and the Millers theorem.
5. To gain knowledge about transistors at high frequencies.
6. To understand the inadequacy of single stage amplifiers and learn about multistage amplifiers.
7. To grasp the concept of feedback and learn about feedback in amplifiers, oscillators and their applications

UNIT- I Semiconductor Diode and its applications:

Diode: operation, characteristics, current equation, different models of diode and its application, Clipping, Clamping, Rectifier, Zener Diode, Zener Regulation .

UNIT-II Transistor and its Analysis:

BJT: Construction, Types of transistors: npn and pnp, modes of operation, Current components, Transistor Configurations: Common Base (CB) ,Common Emitter (CE) and Common Collector Configuration (CC), Transistor Characteristics, Early Effect Transistor Biasing, The operating point, stability.

FET: Basics of FET and MOSFET.

UNIT- III Analysis of Transistor as an Amplifier:

Low Frequency Transistor Amplifiers: h-parameter and its simplified Models for CB, CE, CC configurations, characteristics and Comparison of the three configurations; Miller's Theorem and its Dual, Effect of emitter Resistance in CE amplifiers, Darlington Pair.

High Frequency Transistor Amplifiers: CE hybrid- pi model: Validity and parameter Variation:

Current Gain with Resistive load: frequency response of a single stage CE Amplifier: Gain-Bandwidth product.

UNIT-IV Multistage Amplifiers: Classification, Distortion in Amplifiers, Frequency Response: Bode plots, Step Response: Pass band of Cascaded Stages, Response of a Two-stage RC Coupled Amplifier at Low and high frequencies, Sources of noise in Transistor Circuits; Noise Figure.

UNIT-V Feedback Amplifiers: Feedback concept, Ideal Feedback amplifier, Properties of Negative Feedback Amplifier, Negative Feedback Topologies, Method of Analysis of Feedback amplifiers, types of feedback amplifiers.
Oscillator: Basic concept of Oscillator, Barkhausen criteria for sustained oscillation, phase shift, Wien Bridge, crystal oscillator,

Text Books:

1. Integrated Electronics – Millman & Halkias, TMH Publications
2. Electronic Devices and Circuits, A.K. Maini & V. Agrawal, Wiley India

Reference Books:

1. Electronic Circuit Discrete And Integrated: D. L. Schilling and C. Belove, McGraw-Hill edition
2. Electronic Devices & Circuits – David A. Bell, PHI
3. Microelectronics – Millman and Grabel, TMH Publications
4. Electronic Devices and Circuit Theory – Boylestad & Nashelsky, 8th Ed. PHI.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Branch: **Information Technology** Semester: **IV**

Subject: **Operating System** Code**: B033414(033)**

Total Theory Periods: **40** Total Tutorial Periods**:10**

No. of Class tests **: 2(Minimum)** No. of Assignments to be submitted**: One per Unit**

ESE Duration**: Three Hours** Maximum Marks in ESE**:100** Minimum Marks in ESE**:35**

Course Objectives:

1. General understanding of structure of modern computers
2. To understand purpose, structure and functions of operating systems
3. To illustration of key OS aspects by example

Course Outcomes:

By the end of the course you should be able to-

1. Describe the general architecture of computers and operating system

2. Understand and analyse theory and implementation of: processes, resource control (concurrency etc.), physical and virtual memory, scheduling, I/O and □les.

UNIT I -INTRODUCTION: Operating System objective and function. The Evolution of Operating Systems, Batch, interactive, time – sharing and real time systems. Protection. Operating System Structure: System

COMPONENTS, operating system service, System structure. Distributed Computing, The Key Architecture.

UNIT II- CONCURRENT PROCESSES: Process concept: - Introduction Definitions of "Process", Process States, Process State Transitions, The process Control Block, Operations on Processes, Suspend and Resume, Interrupt Processing, Process generation, Process Scheduling. CPU Scheduling: Scheduling concepts, Performance criteria, and scheduling algorithms. Algorithm evaluation, Multiprocessor scheduling. Asynchronous Concurrent Process: - Introduction, Parallel Processing, Mutual Exclusion, Inter process Communication, the critical section problem, semaphores Classical problems in concurrency, The Producer / consumer problem, readers Writes problem, Dining Philosophers problem.

UNIT III- DEAD LOCKS: System model. Deadlock characterization. Prevention, avoidance and detection, Recovery from dead lock combined approach.

UNIT IV- MEMORY MANAGEMENT: Base machine, resident Monitor, Multiprogramming with fixed partitions. Multiprogramming with variable partitions. Multiple Base Registers. Paging, segmentation paged segmentation, Virtual Memory concept, Demand Paging, Performance, Page Replacement algorithms, Allocation of frames, Thrashing, Cache memory organization impact on performance.

UNIT V- I/O MANAGEMENT & DISK SCHEDULING: I/O Devices and the organization of the I/O function. I/O Buffering, Disk I/O, Operating System Design issues. File System: File concept- File organization and Access mechanism, File Directories, File sharing. Implementation issues. Case Studies: - Unix System, MVS, OS/2, A Virtual Machine Operating System.

Text Books

1. Operating System Concepts, Silberschatz A. and Peterson, J. L., Wiley, 8th Ed.
2. An Introduction to Operating Systems, Dietel, H. N., Addison Wesley, 2nd Ed.

References Books

1. Operating System: Concept & Design, Milenkovic M., and McGraw Hill.
2. Operating System, Stalling, William, Maxwell McMillan International Editons, 1992.
3. Operating System Design & Implementation, Tanenbaum, A. S., Prectice Hall NJ

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Branch: **Information Technology** Semester: **IV**

Subject: **Internet of Things** Code**: B033415(033)**

Total Theory Periods: **40** Total Tutorial Periods**:10**

No. of Class tests**: 2(Minimum)** No. of Assignments to be submitted**: One per Unit**

ESE Duration**: Three Hours** Maximum Marks in ESE**:100** Minimum Marks in ESE **:35**

Course Objectives

1. To understand Concepts, design and characteristics of IoT.
2. To understand Architecture of IoT.
3. To understand basic protocols of IoTs.
4. To understand challenges and applications of IoTs.
5. To develop IoT applications using Tools.

Course Outcomes

6. Students will familiar with the concepts of Internet of Things.
7. Students will familiar with IoT Architecture
8. Students will ready to Analyze basic protocols in wireless sensor network
9. Students will be capable to design IoT applications in different domain and be able to analyze their performance
10. Capable to implement basic IoT applications on embedded platform

UNIT-1 Introduction to IoT

Defining IoT, Characteristics of IoT, Physical design of IoT, Logical design of IoT, Functional blocks of IoT, Communication models & APIs.

UNIT-2 IoT & M2M

Machine to Machine, Difference between IoT and M2M, Software define Network.

UNIT-3 Network & Communication aspects

Wireless medium access issues, MAC protocol survey, Survey routing protocols, Sensor deployment & Node discovery, Data aggregation & dissemination.

UNIT-4 Challenges and Applications of IoT

Design challenges, Development challenges, Security challenges, Other challenges.

Home automation, Industry applications, Surveillance applications, Other IoT applications.

UNIT -5 Developing IoTs

Introduction to Python, Introduction to different IoT tools, Developing applications through IoT tools, Developing sensor based application through embedded system platform, Implementing IoT concepts with python.

Text Books:

1. Vijay Madisetti, Arshdeep Bahga, “Internet of Things: A Hands-On Approach”
2. Waltenegus Dargie,Christian Poellabauer, "Fundamentals of Wireless Sensor Networks: Theory and Practice"

Reference Book:

1. Internet of Things with Arduino Cookbook by Macro Schwart Published by Packt Publishing Ltd.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Branch: Information Technology **Semester: IV**

Subject: Data Structures Laboratory **Subject Code: B033421(033)**

Total Lab Periods:36 **Batch Size: 30**

Maximum Marks: 40 **Minimum Marks: 20**

COURSE OBJECTIVES

1. To implement linear and non-linear data structures
2. Introduce basic operations on linear and non-Linear data structures
3. To understand the different operations of search trees
4. To implement graph traversal algorithms
5. To get familiarized to sorting and searching algorithms

COURSE OUTCOMES

After successful completion if this course, the students will be able to-

1. Identify the appropriate data structure for a given problem.
2. Design various data structure algorithms and estimate their time and space complexity.
3. Apply appropriate algorithm for better utilization of memory.
4. Apply practical knowledge on the applications of data structures.
5. Solve real world problems using sorting and searching techniques.

List of Experiments:

1. Write a program to perform following operations in 1-d array: insertion, deletion, reverse, display, and search.
2. Write a program to perform matrices addition, multiplication and transpose.
3. Write a program to perform linear and binary search.
4. Write a program to add two polynomials using array.
5. Write a program to implement sparse matrices and transpose of matrices.
6. Write a program to perform bubble sort on a given array.
7. Write a program to perform selection sort on a given array.
8. Write a program to perform insertion sort on a given array.
9. Write a program to perform quick sort on a given array.
10. Write a program to perform merge sort on a given array.
11. Write a program to implement stack operations:push, pop.
12. Write a program to check palindrome using stack.
13. Write a program to evaluate postfix expression using stack.
14. Write a program to convert infix expression into postfix or prefix expression using stack.
15. Write a program to check nested expression validity using stack

16. Write a program to implement queue operations: insertion, deletion.
17. Write a program to implement insertion at the beginning and the end of linked list.
18. Write a program which represents stack using linked list.
19. Write a program which represents queue using link list.
20. Write a program to perform arithmetic addition of two very large integers using doubly linked list.
21. Write a program to perform all the three types of tree traversals upon the constructed binary search tree.
22. Write a program to perform binary tree sorting to display the data in ascending and descending order sequence.
23. Write a program to display the adjacency matrix and adjacency list equalent on a given graph structure
24. Write a program to perform depth first search on a given graph structure.
25. Write a program to perform breadth first search on a given graph structure.

TEXT BOOKS

1. Fundamentals of Data Structures – Horowitz and Sahani, Galgotia Publication

REFERENCE BOOKS

2. Data Structures Using C and C++ – Aaron M. Tenenbaum, Yedidyah Langsam and Moshe J. Augenstein, PHI Publications
3. An Introduction to Data Structures with applications – Jean Paul Trembley and Paul G. Sorenson, McGraw Hill Publications
4. Data Structures and Program Design in C – R. Kruse etal, , Pearson Education
5. Data Structures – Lipschutz, Schaum's Outline Series, TMH

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Branch: Information Technology **Semester: IV**

Subject: Database Management System Laboratory **Code: B033422(033)**

Total Lab Periods: 36 **Batch Size: 30**
Maximum Marks: 40 **Minimum Marks: 20**

COURSE OBJECTIVES

- To understand data definitions and data manipulation commands
- To learn the use of nested and join queries
- To understand functions, procedures and procedural extensions of data bases
- To be familiar with the use of a front end tool
- To understand design and implementation of typical database applications

COURSE OUTCOMES

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

- Use typical data definitions and manipulation commands.
- Design applications to test Nested and Join Queries
- Implement simple applications that use Views
- Implement applications that require a Front-end Tool
- Critically analyze the use of Tables, Views, Functions and Procedures

List of experiments:

1. To implement Data Definition language
   1.1Create, alter, drop, truncate

   1.2 To implement Constraints.

   (a) . Primary key, (b).Foreign Key, (c). Check, (d). Unique, (e). Null, (f). Not Null
   (g) . Default, (h). Enable Constraints, (i). Disable Constraints (j). Drop Constraints

2. To implementation of DML, DCL commands in RDBMS
   (b) 2.1 (a).Insert, (b).Select, (c).Update, (d).Delete, (e).commit, (f).rollback,
   (c) (g).save point, (i). Like'%', (j).Relational Operator.
3. To implement Nested Queries & Join Queries

   3.1 (a) Nested Queries related SQL statement using

   Inner Join, Left Outer Join, Right Outer Join, and Full Outer Join

4. To implement Views

   4.1. (a). View, (b).joint view, (c).force view, (d). View with check option

5. (a) Control Structure
   5.1. To write a PL/SQL block for Addition of Two Numbers
   5.2. To write a PL/SQL block for IF Condition
   5.3. To write a PL/SQL block for IF and else condition
   5.4. To write a PL/SQL block for greatest of three numbers using IF AND ELSEIF
   5.5. To write a PL/SQL block for summation of odd numbers using for LOOP

5. (b) Procedures

5.6. To write a PL/SQL Procedure using Positional Parameters
5.7. To write a PL/SQL Procedure using notational parameters
5.8. To write a PL/SQL Procedure for GCD Numbers
5.9. To write a PL/SQL Procedure for cursor implementation
5.10. To write a PL/SQL Procedure for explicit cursors implementation
5.11. To write a PL/SQL Procedure for implicit cursors implementation

5. (c) Functions:

5.12. To write a PL/SQL block to implementation of factorial using function
5.13. To write a PL/SQL function to search an address from the given database

6. Triggers:

6.1. To write a Trigger to pop-up the DML operations
6.2. To write a Trigger to check the age valid or not Using Message Alert.
6.3. Create a Trigger for Raise appropriate error code and error message.
6.4. Create a Trigger for a table it will update another table while inserting values

7. Case study

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Branch: Information Technology **Semester: IV**
Subject: Operating System (UNIX) Lab **Code: B033423(033)**
Total Lab Periods: 36 **Batch Size: 30**
Maximum Marks: 40 **Minimum Marks: 20**
Note: Use Bash for Shell scripts.

List of Experiment to be performed

1.Demonstration of Basic UNIX Commands

2. a) Write a shell script that accepts a file name, starting and ending line numbers as arguments and displays all the lines between the given line numbers.

b) Write a shell script that deletes all lines containing a specified word in one or more files supplied as arguments to it.

3. a) Write a shell script that displays a list of all the files in the current directory to which the user has read, write and execute permissions.

b) Write a shell script that receives any number of file names as arguments checks if every argument supplied is a file or a directory and reports accordingly. Whenever the argument is a file, the number of lines on it is also reported.

4. a) Write a shell script to list all of the directory files in a directory.

b) Write a shell script to find factorial of a given integer.

5. a) Write an awk script to count the number of lines in a file that do not contain vowels.

b) Write an awk script to find the number of characters, words and lines in a file.

6. a) Write a shell script that accepts a list of file names as its arguments, counts and reports the occurrence of each word that is present in the first argument file on other argument files.

b) Write a c program that makes a copy of a file using standard I/O and system calls.

7. a) Implement in C the following Unix commands using System calls:- cat , ls, mv

b) Write a C program to emulate the Unix ls –l command.

8. Write a program that takes one or more file/directory names as command line input and reports the following information on the file.

a) File type.

b) Number of links.

c) Time of last access.

d) Read, Write and Execute permissions.

9. a) Write a C program to list for every file in a directory, its inode number and file name.

b) Write a C program that demonstrates redirection of standard output to a file. Ex: ls > f1.

10. a) Write a C program to create a child process and allow the parent to display “parent” and the child to display “child” on the screen.

b) Write a C program that illustrates how to execute two commands concurrently with a command pipe. Ex:- ls –l | sort

11. a) Write a C program to create a Zombie process.

b) Write a C program that illustrates how an orphan is created.

12. a) Write a shell script to accept three numbers and display the largest.

b) Write a shell script to find the number of files in a directory.

c) Write a shell script to display first ten positive numbers using until loop.

13. a) Write a shell script to check if a particular user has logged in or not. If not, continue the loop till he/she logins.

Once the required user logins, display a message.

b) Write a shell script to accept the name, grade, and basic salary from the user. Write the details into a file called

employee, separating the fields with a colon (,) continue the process till the user wants.

14. a) Write a shell script to check whether a file is existing or not.

b) Write a shell script to find the mode of a file in a directory.

c) Write a shell script which will accept different numbers and find their sum.

15. a) Write a menu driven program to display a menu of options and depending upon the user's choice execute the

associated command.

b) Write a shell script to calculate the total salary payable to all the employees from the employee file. The salary

should be taken from the 8th field of the employee file.

16. a) Write a shell script to copy the source file to the target file.

b) Write a shell script to print the first 10 odd numbers using the while loop.

c) Write a shell script to reverse the digits of a given number.

References:

1. Unix Shell programming, Yashwanth Kanitkar, 1st Edition, BPB Publisher
2. Unix for programmers and users, 3rd edition, Graham Glass, King Ables, Pearson education.
3. Unix programming environment, Kernighan and Pike, PHI. / Pearson Education
4. The Complete Reference Unix, Rosen, Host, Klee, Farber, Rosinski, Second Edition, TMH.

Chhattisgarh Swami Vivekananda Technical University, Bhilai

Branch: Information Technology **Semester: IV**

Subject: Virtual Lab (IoT Laboratory) **Code: B033424(033)**

Total Lab Periods: 36 **Batch Size: 30**
Maximum Marks: 40 **Minimum Marks: 20**

COURSE OBJECTIVES

- To introduce the terminology, technology and its applications
- To introduce the concept of M2M (machine to machine) with necessary protocols
- To introduce the Python Scripting Language which is used in many IoT devices
- To introduce the Raspberry PI platform, that is widely used in IoT applications
- To introduce the implementation of web-based services on IoT devices

COURSE OUTCOMES

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

- Describe what IoT is and how it works today
- Recognize the factors that contributed to the emergence of IoT, Design and program IoT devices
- Use real IoT protocols for communication, secure the elements of an IoT device
- Design an IoT device to work with a Cloud Computing infrastructure
- Transfer IoT data to the cloud and in between cloud providers

List of experiments:

1. Introduction to various sensors and various actuators & its Application (Students have to prepare Report for the same). Perform Experiment using Arduino Uno to measure the distance of any object using Ultrasonic Sensor.

a) PIR Motion

b) Rain Drop Sensor.

c) Moisture Sensor.

d) Temperature Sensor.

e) Touch Sensor.

f) Infrared Sensor.

g) Servo Moto.

h) RFID Sensor.

i) Bluetooth Module.

j) Wi-Fi Module.

2. Demonstrate NodeMCU and its working
3. Getting Started with ESP8266 Wi-Fi SoC
4. Hands-on with on-board peripherals of ESP8266
5. Demonstrate Arduino and its pins.
6. Perform Experiment using Arduino Uno to measure the distance of any object using Ultrasonic Sensor.
7. Create a circuit using Arduino and sensors. Perform experiment using Arduino Uno to Learn Working of Servo Motor
8. Creating a webpage and display the values available through Arduino.
9. Demonstration of Setup & Working of Raspberry Pi. (Students have to prepare the Report for the same.)
10. OPEN Ended problem: Students are required to submit an IOT based project using the Microcontroller or a Raspberry Pi and connecting various sensors and actuators. The data for the same should be displayed via a webpage or a web app.
11. Study of other IoT Board (Student Activity)

LIST OF SUGGESTED BOOKS

1. Vijay Madisetti, Arshdeep Bahga, Ïnternet of Things, "A Hands on Approach", University Press
2. Dr. SRN Reddy, Rachit Thukral and Manasi Mishra, "Introduction to Internet of Things: A practical Approach", ETI Labs
3. Pethuru Raj and Anupama C. Raman, "The Internet of Things: Enabling Technologies,Platforms, and Use Cases", CRC Press
4. Jeeva Jose, "Internet of Things", Khanna Publishing House, Delhi
5. Adrian McEwen, "Designing the Internet of Things", Wiley
6. Raj Kamal, "Internet of Things: Architecture and Design", McGraw Hill
7. Cuno Pfister, "Getting Started with the Internet of Things", O Reilly Media

Chhattisgarh Swami Vivekanand Technical University, Bhilai

Name of program: **Bachelor of Technology**

Branch: **Common to All Branches** Semester: **III**

Subject: **Indian Culture and Constitution of India** **Code: B000406(046)**

Total Theory Periods: **2/Week** Total Tutorial Periods: **NIL**

Assignments: **Two (Minimum)** Total Marks in ESE: **NIL** Marks in TA: **10**

Objective: The Constitution is the supreme law and it helps to maintain **integrity** in the society and to promote unity among the citizens to build a great nation. The main objective of the Indian Constitution is to promote harmony throughout the nation.

Course Objectives

Upon completion of this course, the student shall be able

- To understand Meaning and concepts of Traditional and Modern of Culture
- To understand Sources of the Study of Indian Culture
- To Enable the student to understand the history and importance of constitution
- To understand philosophy of fundamental rights and duties
- To understand the powers and functions of executive, legislature and judiciary
- To understand the powers and functions of state government
- To understand the recent trends in Indian constitutional and election commission of India.

UNIT-I

Meaning and concepts of Culture: Traditional and Modern concepts of Culture-Notions of Culture in textual tradition, anthropological, archaeological and sociological understanding of the term culture. Elements of Culture, concept of Indianness and value system. Relation between culture and civilization. Historiography and approaches to the study of Indian Culture– Stereotypes, Objectivity and Bias, Imperialist, Nationalist, Marxist and Subaltern. Heritage of India and world's debt to Indian Culture.

UNIT–II

Sources of the Study of Indian Culture: Archaeological: cultural remains, Monuments, Numismatics, Epigraphy; Literary sources and Oral traditions; Foreign Accounts; Archival sources.

UNIT–III

History of Indian Constitution Constitutional History, Preamble salient features, citizenship, Method of Amendment and Recent Amendments. **Rights and Duties** Fundamental Rights and Directive Principles of State Policy. Fundamental Duties. Difference between Fundamental

Rights and Directive Principles of State Policy

Union Government a) President-powers and functions. Vice president powers and functions, Prime Minister and council of ministers powers and functions. b) Parliament- Loksabha, Rajyasabha- composition powers and functions.

c) Judiciary (Supreme Court) composition powers and functions Judicial Activism

UNIT–IV

State Government a) Governor: powers and functions b) Chief minister: powers and functions c) State Legislative Assembly and Legislative Council- composition powers and functions. d) High Court : composition powers and functions

UNIT–V

Recent Trends in Indian Constitutional a) Basic structure of Indian Constitution. b) Electoral Reforms c) Panchayati Raj system in India.

Books of Reference

1. Dr. P. K. Agrawal Indian Culture, Art and Heritage,
2. P. Raghunadha Rao Indian Heritage and Culture
3. M.V.Pylee, An Introduction to the Constitution of India,NewDelhi,Vikas,2005.
4. Subhash C.Kashyap, Our Constitution: An Introduction to India's Constitution and constitutional Law, New Delhi, National Book Trust, 2000.
5. Durga Das Basu, Introduction to the Constitution of India ,NewDelhi,Prentice Hall of India,2001.
6. D.C.Gupta, Indian Government and Politics,VIII Edition,New Delhi, Vikas, 1994.
7. V.D.Mahajan, Constitutional Development and National Movement inIndia, New Delhi, S. Chand and Co., latest edition.