SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
(Engineering College), VIDISHA M.P.
(An Autonomous Institute Affiliated to RGPV Bhopal)
Department of Information Technology

Semester/Year			Program		B. Tech.
Subject Category	ESC	Subject Code:	CSA101	Subject Name:	Introduction to Computer Science and Engineering

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks	L	T	P	
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz					
60	20	10	10	30	10	10	150	3	0	2	4

Course Objective:

The objective of this course is to introduce the Computer Science and Engineering and Basic concepts of computers. To understand the component of computer and generation of computer. To familiarize students with the programming and problem-solving concepts using C Programming language. The course will help student to solve the problem using computer programming.

Course Outcomes:

Upon completion of this course, the student will be able to:

- CO1: Familiarize the importance of computer science and engineering. Understand theconcept of generation of computer and learn about component of computer system.
- CO2: Understand the concept of Problem-solving using C and Implement the flowchart andprogram for solving Mathematical and Engineering problems.
- CO3: Articulate the Modular Programming Concept and Solve the Engineering Problem using Modular Programming.
- CO4: Articulate the Advance C Programming Concept to Solve the Engineering Problemusing Structure, Union and File Management.
- CO5: Describe the various Computer Science disciplines and their applications.

UNITs	Descriptions	Hrs.	CO's
I	**Introduction to Computer Science and Engineering**: Computer: Definition, Classification, Generation, Organization i.e. CPU, register, Bus architecture, Instruction set, Memory & Storage Systems, I/O Devices, and System & Application Software.	6	CO1
II	**Problem Solving using C**: Programming solving using computer concept, flowchart. Rules/ conventions of coding, documentation, naming variables, History of C, Structure of a C Program; Data types, Constant & Variable, naming variables, Operators (arithmetic, logical, bitwise, relational, ternary, Pointers - & and * operators) & expressions, Control Constructs — if-else, for, while, do-while, Case switch statement ,Special constructs — Break, continue, exit(), got & labels, Type conversion & type casting, Priority & Associatively of operators; Type modifiers.	10	CO2
III	**Modular Programming:** Arrays; storage classes, Functions; Arguments; Return value; Parameter passing – call by value, call by reference; Return statement; Scope, visibility and life-time rules for various types of variables; Calling a function; Recursion – basics, comparison with iteration, types of recursion- direct, indirect, tree and tail recursion, when to avoid recursion.	9	CO3
IV	**Advance C Programming:** Structure – basic, declaration, membership operator, pointer to structure, referential operator, self-referential structures, structure within structure, array in structure, array of structures. Union – basic, declaration; Pre-processor Directives: C pre-processor –basics, #Include, #define, Enumerated data type; Types of File Handling inC- concepts, functions.	8	CO4

V	**Introduction to Computer Science disciplines and their applications**: Networking, Security, Operating System, Data Science, Machine Learning, Cloud Computing, Block chain, web development.	7	CO5
Guest Lectures (if any)		May be arranged as required	
Total Hours		**40**	

List of Experiments

1. Make a Poster on Component of Computer Systems/Generation of Computer System with their working. (CO1)
2. Write a program to determine given number is Armstrong number or not.(CO2)
3. Write a program to determine the roots of quadratic equation $ax^2+bx+c=0$(CO2)
4. Write a program to calculate the factorial of an integer quantity. (CO2)
5. Write a program to print diamond shape using star. (CO2)
6. Write a Program to find and print the sum of first N Prime Numbers.(CO2)
7. Write a program to convert binary to decimal and decimal to binary.(CO3)
8. Write a Program in C to read two arrays, add them and to print the resultant array. Use read_mat(),add_mat() and print_mat() functions. Array should not be declared as global variables. (CO3)
9. Write a program to read two matrix and apply addition, subtraction, multiplication, transpose operation and display result. (CO3)
10. Write a C Program to calculate area of triangle, rectangle, circle using function. (CO3)
11. Write a program using recursive function to output in reverse the sequence of characters input from the keyboard. The input is terminated by new line. Your output should be on a new line. Write an iterative solution for the same.
12. Write a Program to store data about 10 books. Which contain book title, price and number of copies of the book. After reading the data about books your program should display the data of all the book which cost more than Rs 200. (CO4)
13. Write a program using structure to accept the current time in (Hr:min:sec) , update it by one second andto print it. (CO4)
14. Write a program to count characters, spaces and new lines in a file. The name of the file should be entered through command line. (CO4)
15. Create a Poster on any one latest computer science and engineering disciplines. (CO5)

Text Book-

- Let us C By Yashwant Kanetkar, BPB Publication
- Programming in C, Schaum Outline,Mc Graw-Hill

Reference Books-

- Programming in ANSI-C By E. Balagurusami, TMHPublication
- C Programming language By Kernighan, Brian, W, Retchie, Dennis,PHI Publication
- Information Technology: Theory and Practice y PRADEEP K. SINHA (Author), PRITI SINHA (Author)

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

List/Links of e-learning resource

List and Links of e-learning resources:

1. https://nptel.ac.in/courses/108/105/108105132/
2. https://de-iitr.vlabs.ac.in/

Recommendation by Board of studies on	
Approval by Academic council on	
Compiled and designed by	
Subject handled by department	

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Department of Information Technology

Semester/Year			Program		B.Tech.
Subject Category	ESC	Subject Code:	CSA102	Subject Name:	Digital Electronics

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assign-ment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:

Basics of Physics

Course Objective:

The objective of this course is to provide the fundamental concepts associated with the digital logic and circuit design. To familiarize students with the different number systems, logic gates, minimization of logic circuits and combinational and sequential circuits utilized in the different digital circuits and systems. The course will help student to design and analyze the digital circuits and
Systems.

Course Outcomes:

Upon completion of this course, the student will be able to:

- CO1: Convert different number systems and codes used in digital circuits and systems.
- CO2: Simplify and analyze the digital logic circuits using Boolean algebra and other mapping techniques.
- CO3: Analyse and design different combinational logic circuits using different mappingtechniques and mathematical tools.
- CO4: Compare different types of sequential circuits viz. counters in the domain of analysis.

UNITs	Descriptions	Hrs.	CO's
I	**Introduction to Digital Electronics**: Review of number system and conversions; Binary Arithmetic, Signed and Unsigned representation, Binary codes, Gray Code, Code Conversions, Error detection and correction codes - parity check codes and Hamming code.	8	CO1
II	**Boolean Algebra and Switching Functions** - Study of basic logic gates, Basic postulates and fundamental theorems of Boolean algebra; Standard representation of logic functions - SOP and POS forms; Simplification of switching functions -K-map and Quine-McCluskey tabular methods.	8	CO2

III	**Combinational Logic Modules and their applications**: Adders, Subtractors, Code Converters, parity generators and comparators, Encoders & Decoders, BCD to seven-segment decoder, Multiplexers & Demultiplexers and their applications.	9	CO3
IV	**Sequential Circuits and Systems:** Set-Reset latches and flip flops, D-flipflop, R-S flip-flop, J-K Flip-flop, Master slave Flip flop, edge triggered flip-flop, T flip-flops, Shift registers, classification of shift registers	7	CO4
V	Counters classification: asynchronous counters, synchronous counters, counters design, BCD counter, MOD counters, ripple counter, Introduction to finite state machines.	8	CO4
Guest Lectures (if any)		--	
Total Hours		40	

List of Experiments

Text Books-

- M. Mano, "Digital Logic and Computer Design", Pearson Education.
- T. L. Floyd, "Digital Fundamentals", Pearson Education.
- A. Anand Kumar, "Fundamentals of Digital Circuits", PHI.

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/Assignments, term work, end-semester examinations, and end-semester practical examinations.

List/Links of e-learning resource

List and Links of e-learning resources: https://nptel.ac.in/courses/108/105/108105132/https://de-iitr.vlabs.ac.in/

Recommendation by Board of studies on	
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Compiled and designed by	
Subject handled by department	

SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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Department of Humanities and Management

Semester/Year		II Year	Program		B. Tech All Branches
Subject Category	MAC	Subject Code:	MAC101	Subject Name:	Universal Human Values

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks	L	T	P	
End Sem	Mid-Sem	Quiz	Assignment	End Sem	Lab-Work	Quiz					
00	00	00	00	60	20	20	100	-	-	2	Grade

Prerequisites:

During the Induction Program, students would get an initial exposure to human values through Universal Human Values — I. This exposure is to be augmented by this compulsory full semester foundation course.

Course Objective:

At the end of the course, the students will be able to:

1. Develop a holistic perspective based on exploration about others and themselves.
2. Develop clarity, importance of harmony and humanity towards family, society and nature/existence.
3. Strengthen self-reflection.
4. Develop commitment and courage to act.

Course Outcomes:

1. By the end of the course, students will become aware of themselves, and their surroundings(family, society, nature)
2. They would have better critical ability.
3. They would become more responsible in life; and keeping human relationships and human naturein mind will be able to handle problems with sustainable solutions.
4. They would also become sensitive to their commitment towards nature and existence.
5. They would be able to apply what they have learnt to their own selves in different day-to-day real-life scenarios, at least a beginning would be made in this direction.

UNITs	Descriptions	Hrs.	CO's
I	Introduction - Need, Basic Guidelines, Content and Process for Value Education 1. Self-Exploration–what is it? - Its content and process; 'Natural Acceptance' and Experiential Validation- as the process for self- exploration 2. Continuous Happiness and Prosperity- A look at basic Human Aspirations 3. Right understanding, Relationship and Physical Facility- the basic requirements for fulfilment of aspirations of every human being with their correct priority 4. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario	8	1
	5. Method to fulfil the above human aspirations: understanding and living in harmony at various levels. Include practice sessions to discuss natural acceptance in human being as the innate acceptance for living		

	with responsibility.		
II	Understanding Harmony in the Human Being - Harmony in Myself! 1. Understanding human being as a co-existence of the sentient 'I' and the material 'Body' 2. Understanding the needs of Self ('I') and 'Body' - happiness and physical facility 3. Understanding the characteristics and activities of 'I' and harmony in 'I' 4. Understanding the harmony of I with the Body: Sanyam and Health; correct appraisal of Physical needs, meaning of Prosperity in detail 5. To ensure Sanyam and Health. Include practice sessions to discuss the role others have played in making material goods. Identifying from one's own life. Differentiate between prosperity and accumulation.	6	2
III	Understanding Harmony in the Family and Society- Harmony in Human-Human Relationship 1. Understanding values in human-human relationship; meaning of Justice (nine universal values in relationships) and program for its fulfillment to ensure mutual happiness. 2. Understanding the meaning of Trust; Difference between intention and competence. 3.Understanding the meaning of Respect, Difference between Respect and differentiation; the other salient values in relationship. 4.Understanding the harmony in the society (society being an extension of family): Resolution, Prosperity, fearlessness (trust) and co-existence as comprehensive Human Goals. 5. Visualizing a universal harmonious order in society- Undivided Society, Universal Order- from family to world family. Gratitude as a universal value in relationships. Elicit examples from students' lives.	4	3
IV	Understanding Harmony in the Nature and Existence - Whole existence as Coexistence 1. Understanding the harmony in the Nature. 2. Interconnectedness and mutual fulfilment among the four orders of nature recyclability and self-regulation in nature. Understanding Existence as Co-existence of mutually interacting units in all-pervasive space. 3. Holistic perception of harmony at all levels of existence. 4. Include practice sessions to discuss human being as cause of imbalance in nature (film "Home" can be used), pollution, depletion of resources and role of technology etc.	8	4
V	Implications of the above Holistic Understanding of Harmony on Professional Ethics 1. Natural acceptance of human values. 2. Definitiveness of Ethical Human Conduct. 3. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order 4. Competence in professional ethics: a. Ability to utilize the professional competence for augmenting universal human order b. Ability to identify the	9	5

	5. scope and characteristics of people friendly and Eco-friendly production systems, c. Ability to identify and develop		
Total		35	

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Department of Information Technology

Semester/Year			Program		B.Tech.
Subject Category	ESC	Subject Code:	CSA103	Subject Name:	Problem Solving using Data Structures

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks				
End Sem	Mid-Sem	Assignment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:

Logical thinking and Computer Fundamentals

Course Objective:

Introduce the fundamentals of data structures and how these concepts are useful in problemsolving.

Course Outcomes:

CO-1Understand- Problem solving using of data structure and various searching and sortingmethods.
CO-2 Apply- Apply different concepts of data structures to solve different computing problems.
CO-3 Analyse- Analyze the access pattern of various data structure and understand theirapplicability.
CO-4 Evaluate-Evaluate and Compare the performance of different data structures on real worldproblems.
CO-5 Discuss- Graph and Tree structure with their operations and applicability

UNITs	Descriptions	Hrs.	CO's
I	Problem solving concepts: top-down, bottom-up design, Concept of data type, variable, constant and pointers. Dynamic memory allocation. Algorithm: Definition and complexity Analysis. Introduction to data structure: Linear, Nonlinear, Primitive and Nonprimitive. Arrays-Concepts of Arrays, Single dimensional array, two- dimensional array- Representation and Address Calculation, Operations on arrays with algorithms (traversing, searching, inserting, deleting) and analysis.	08	1
II	List-Singly linked lists: Representation in memory, Operations on singly linked list with algorithms (traversing, searching, insertion, deletion)Doubly linked list-Operations with algorithms and analysis. Circular linked lists-Operations with algorithms and analysis. Representation & manipulations of polynomials/sets using linked lists.	06	2
III	Stack- Introduction to Stack and its operations, Implementation of stack using array and linked list with comparison. Application of stacks (Polish Notations, converting infix to postfix notation, evaluating postfix notation, Parenthesis balancing, Recursion). Queue- Introduction to Queue and its operations. Implementation of queue using array and linked list. De-queue, circular queue, priority Queue. Applications of queue.	09	3
IV	Tree- Definition and terminology, concept of binary tree and representation, Traversing binary tree (pre order, post order, in order) Operation with algorithm -insertion and deletion. Binary Search Trees and Concept of balance tree (AVL). Graph- Definition and terminology, Types of graphs, Representation of graph. Traversing of graph- Breadth First Traversing and Depth First Traversing.	09	4

V	Searching- Search methods- Linear search, Binary search and Hashing (collision, chaining and probing) with their algorithms and analysis. Sorting-Sorting Methods-Bubble sort, Selection sort, Insertion sort, Quick sort, Merge sort, Radix sort, Shell sort with their algorithms and Analysis.	08	5
Guest Lectures (if any)		--	
Total Hours		40	

List of Experiments

1. Write program to implement pointers and structure in C to understand the concepts ofDynamic memory allocation.
2. Write a program to implement concept of linear array with following operations:
   i. Traverse an array.
   ii. Find minimum item, maximum item, and average of an array items.
   iii. Insert a new item at beginning, end and middle position within an array.
   iv. Delete an item from an array.
3. Write a program to implement singly linked list with following operations
   i. Insert a new item at beginning, end and middle position within a single linked list.
   ii. Delete an item from single linked list.
   iii. Traverse a single linked list.
4. Modify the singly linked list program to make it for doubly linked list.
5. Write a program to implement Stack with its operations (Push, Pop, Peek, IsEmpty) using:
   i. Using array
   ii. Using linked list
6. Write a program to evaluate postfix notation using stack.
7. Write program to implement queue with its operations (enqueue, dequeue) using:
   i. Using array
   ii. Using linked list
8. Modify the queue program to implement circular queue with its operations.
9. Write a program to implement binary search tree with insert and delete operations.
10. Write a program to implement depth first traverse and breadth first traverse on a graph.
11. Write program to implement linear search and binary search on a given array.
12. Write a program to sort a given list of 10000 random integers and compare their executiontime using:
    i. Bubble sort
    ii. Insertion sort
    iii. Merge sort
    iv. Quick sort
    v. Radix sort

Reference Books-

- Data Structure- Schaum's Series- McGraw Hill Publication
- Data Structure- Horwitz and Sartaj Sahni
- Data Structure through C, Yashwant Kanekar, BPB Publication.

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, termwork, end-semester examinations, and end-semester practical examinations.

List/Links of e-learning resource

Compiled and designed by	IT
Subject handled by department	IT

23/12/25

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Department of Information Technology

Semester/Year			Program		B.Tech.
Subject Category	ESC	Subject Code:	ITC101	Subject Name:	Python Programming

Maximum Marks Allotted								Contact Hours			Total Credits
Theory				Practical			Total Marks	L	T	P	
End Sem	Mid-Sem	Assign-ment	Quiz	End Sem	Lab-Work	Quiz					
60	20	10	10	30	10	10	150	3	0	2	4

Prerequisites:

- High School Level Mathematics
- Elementary Knowledge of Computer

Course Objective:

This course introduces core programming basics—including data types, control structures, algorithm development, and program design with functions via the Python programming language. The course discusses the fundamental principles of Object-Oriented Programming.

Course Outcomes:

Upon completion of this course, the student will be able to:

CO-1: Ability to install python and its different packages.
CO-2: Implement solution logic of problem and draw it in the form of algorithm.
CO-3: Design and write a python program for given algorithm.
CO-4: Understand and apply the list logics to problem solution.
CO-5: Understand Object Oriented with reference to python programming.

UNITs	Descriptions	Hrs.	CO's
I	Introduction to computer science, algorithms, data representation in computers, hardware, software and operating system. Installation of python-interactive shell, IDLE, saving, editing, and running a script. The concepts of data types: variables, immutable variables, numerical types, operators, expressions, Indentation and comments in the program.	8	CO1
II	Conditional Statements- Conditions, Boolean Logic, Logical operators and Ranges. Control Statements- Break, Continue and Pass. Flow Control-if, if-else, nested if-else, Loop statements- for loop, while loop, Nested loops.	8	CO2
III	String: subscript operator, indexing, slicing a string; strings and number system: converting strings to numbers and vice versa. Strings and text files, manipulating files and directories, os and sys modules, text files: reading/writing text and numbers from/to a file, creating and reading a formatted file (csv or tab-separated).	9	CO3
IV	Lists, tuples, and dictionaries. Basic list operators, replacing, inserting, removing an element, searching and sorting lists, dictionary literals, adding and removing keys, accessing and replacing values, traversing dictionaries.	7	CO4
V	Classes and OOP: Classes, objects, attributes and methods, defining classes, design with classes, Inheritance, Overloading, Overriding, and Data hiding. Exception: Exception Handling, except clause, Try finally clause, User Defined Exceptions.	8	CO5
Guest Lectures (if any)		--	

Total Hours	40	

List of Experiments

1. Write a program in python to check a number whether it is prime or not.
2. Write a program to check a number whether it is palindrome or not.
3. Write a function to swap the values of two variables through a function.
4. Write a python program to Read a file line by line and print it.
5. Write a program to display the number of lines in the file and size of a file in bytes.
6. Write a program to calculate the factorial of an integer using recursion.
7. Write a program to print Fibonacci series using recursion.
8. Write a program for binary search.
9. Python Program for Sum of squares of first n natural numbers.
10. Python Program to find sum of array.
11. Python program to read character by character from a file.
12. Python Program to print with your own font.
13. Python program to print even length words in a string.
14. Python program to check if a string is palindrome or not.
15. Program to print ASCII Value of a character.
16. Python program to find smallest and largest number in a list.
17. Python program to find the size of a Tuple.

Text Books-

- M. Mano, "Digital Logic and Computer Design", Pearson Education.
- T. L. Floyd, "Digital Fundamentals", Pearson Education.
- A. Anand Kumar, "Fundamentals of Digital Circuits", PHI.

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations.

List/Links of e-learning resource

List and Links of e-learning resources:

4. https://nptel.ac.in/courses/108/105/108105132/
5. https://de-iitr.vlabs.ac.in/

Compiled and designed by	IT
Subject handled by department	IT

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Department of Information Technology

Semester/Year		II/I	Program		B.Tech
Subject Category	ESC	Subject Code:	CSA104	Subject Name:	Principle of System Software

Maximum Marks Allotted							Contact Hours			Total Credits
Theory			Practical			Total Marks				
End Sem	Mid-Sem	Assingment	Quiz	End sem	Lab-Work		L	T	P	
60	20	10	10	-	-	100	3	-	0	3

Prerequisites:

Fundamental knowledge of Computer

Course Objective:

- To understand the relationship between system software and machinearchitecture.
- To understand the processing of an HLL program for execution on a computer.
- To understand the process of scanning and parsing.
- To know the design and implementation of assemblers, macro processor, linker and compiler.
- To have an understanding of loaders, system software tools.
- To understand and know the working of device drivers

Course Outcomes:

On successful completion of the course, the student will:

1. Be able to compare various system software related to the given system
2. Be able to understand the concepts required to develop the system software
3. Be able to make proper use of system software tools

UNITs	Descriptions	Hrs.	CO's
I	System Software and Language Processors software tools: Introduction, Language Processing Activities, Fundamentals of Language Processing & Language Specification, and Language Processor Development Tools. Data Structures for Language Processing: Search Data structures, Allocation Data Structures. Software Tools: Software Tools for Program Development, Editors, Debug Monitors, Programming Environments, User Interfaces.	8	1
II	Assemblers: Elements of Assembly Language Programming, A Simple Assembly Scheme, Pass Structure of Assemblers, Design of a Two Pass Assembler,	8	1
III	Macros and Macro Processors: Macro Definition and Call, Macro Expansion, Nested Macro Calls, Advanced Macro Facilities, Design of a Macro Preprocessor.	9	2
IV	Interpreters: Use and overview of interpreters, Pure and impure interpreters.	5	2

V	Linkers and Loaders: Introduction to linkers, Relocation and Linking Concepts, Design of a Linker, Self-Relocating Programs andLoaders	10	3
Guest Lectures (if any)		NIL	
Total Hours		40	

Suggestive list of experiments:

Text Book-

- D. M. Dhamdhere, "Systems Programming and Operating Systems", Second Revised Edition, Tata McGraw-Hill, 1999.

Reference Books-Leland L. Beck, "System Software – An Introduction to Systems Programming", 3rd

- Edition, Pearson Education Asia, 2000.
- Santanu Chattopadhyay, "System Software", Prentice-Hall India, 2007
- Alfred V. Aho, Monica S. Lam, Ravi Sethi, Jeffrey D. Ullman, "Compilers: Principles, Techniques, and Tools",2nd Edition, Pearson Education Asia

Modes of Evaluation and Rubric

The evaluation modes consist of performance in Two mid-semester Tests, Quiz/ Assignments, term work, end-semester examinations, and end-semester practical examinations

List/Links of e-learning resource

Compiled and designed by	IT
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SAMRAT ASHOK TECHNOLOGICAL INSTITUTE
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(An Autonomous Institute Affiliated to RGPV Bhopal)
Department of Information Technology

Semester/Year			Program		B. Tech						
Subject Category	ESC	Subject Code:	CSL110	Subject Name:	Computer Workshop						
Maximum Marks Allotted									Contact Hours			Total Credits
Theory				Practical			Total Marks					
End Sem	Mid-Sem	Assign ment	Quiz	End Sem	Lab-Work	Quiz		L	T	P	
--	--	--	--	30	10	10	50	1	--	2	2

Prerequisites:

Course Objective:

1. 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.
2. 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.
3. To impart fundamentals of file concepts kernel support for file, File structure related system calls (file API's).
4. To facilitate students in understanding Inter process communication.
5. To facilitate students in understanding semaphore and shared memory.
6. To facilitate students in understanding process.

Course Outcomes:

Upon completion of this course, the student will be able to:

CO1. Ability to use various Linux commands that are used to manipulate systemoperations at admin level and a prerequisite to pursue job as a Network administrator.
CO2. Ability to write Shell Programming using Linux commands.
CO3. Ability to design and write application to manipulate internal kernel level Linux FileSystem.
CO4. Ability to develop IPC-API's that can be used to control various processes forsynchronization.
CO5. Ability to develop Network Programming that allows applications to make efficient use of resources available on different machines in a network.

UNITs	Descriptions	Hrs.	CO's
I	INTRODUCTION TO LINUX AND LINUX UTILITIES: A brief history of LINUX, architecture of LINUX, features of LINUX, introduction to vi editor. Linux commands, file handling utilities, security by file permissions, process utilities, disk utilities, networking commands, Text Processing utilities and backup utilities	4	CO1

II	Introduction to Shells: Linux Session, Standard Streams, Redirection, Pipes, Command-Line Editing, Options, Shell/Environment Customization. Filters: Filters and Pipes, Concatenating files, Display Beginning and End of files, Operations on Characters, Files with Duplicate Lines, Count Characters, Words or Lines, Comparing Files.	4	CO2
III	Grep: Operation, grep Family, Searching for File Content. Sed: Scripts, Operation, Addresses, commands, Applications, grepand sed.UNIX FILE STRUCTURE: Introduction to UNIX file system, inode (Index Node), file descriptors, system calls and device drivers. FileManagement:File Structures, System Calls for File Management, Directory API.	4	CO3
IV	PROCESS AND SIGNALS: Process, process identifiers, process structure: process table, viewing processes, system processes, process scheduling, zombie processes, orphan process, unreliable signals, interrupted system calls. File locking: creating lock files, locking regions, use of read and write with locking, competing locks, other lock commands, deadlocks.	4	CO4
V	INTER PROCESS COMMUNICATION: Pipe, process pipes, the pipe call, parent and child processes, and named pipes, semaphores, message queues, shared memory. INTRODUCTION TO SOCKETS: Socket, socket connections - socket attributes, socket addresses.	4	CO5
Guest Lectures (if any)		--	
Total Hours		20	

List of Experiments

1. Write a program using echo, printf, script, passwd, uname, who, date, stty, pwdcommands.
2. Write a program using unlink, du, df, mount, umount, find, unmask, ulimit, ps, w, finger,arp, ftp commands.
3. Write a program using 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 commands.
4. Write a shell script that accepts a file name, starting and ending line numbers asarguments and displays all the lines between the given line numbers.
5. Illustrate by writing script that will print, message "Hello World, in Bold and Blink effect,and in different colours like red, brown etc using echo commands?
6. Write a shell script that deletes all lines containing a specified word in one or more filessupplied as arguments to it.
7. Illustrate by writing script using for loop to print the following patterns?
8. Write a shell script that displays a list of all the files in the current directory to which theuser has read, write and execute permissions.
9. Write a program inter-process communication.
10. Write a program to communicate using sockets.

Text Books-

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

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REFERENCES Books-: 1. Linux System Programming, Robert Love, O'Reilly, SPD. 2. Advanced Programming in the UNIX environment, 2nd Edition, W.R.Stevens, PearsonEducation. 3. UNIX Network Programming, W.R. Stevens, PHI. UNIX for Programmers and Users, 3rd Edition, Graham Glass, King Ables, Pearson Education
Modes of Evaluation and Rubric
The evaluation modes consist of performance in Quiz/ Assignments, term work, and end-semesterpractical examinations.
List/Links of e-learning resource

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