Govt. Digvijay Autonomous PG College Rajnandgaon(CG)

SCHEME OF EXAMINATION
&
SYLLABUS

FOR

THE FOUR-YEAR UNDERGRADUATE PROGRAMME

(FYUGP)

As per provision of NEP-2020 to be implemented from Academic Year 2022 onwards

BACHELOR OF COMPUTER APPLICATION
(BCA- 3RD & 4TH) SEMESTER EXAM

UNDER

DEPARTMENT OF COMPUTER APPLICATION

SESSION – 2024-25

(APPROVED BY BOARD OF STUDIES)

BCA- III Semester

S.No	Course Type	Course-code	Subject	Periods			Credit	Theory Marks	Internal Marks	Total Marks	
				L	T	P				Max	Min
1	DSC-VII	UBCCT301	Operating system with Linux	3	0	0	3	80	20	100	40
		UBCCL301	Lab Operating system	0	0	1	1	40	10	50	17
2	DSC-VIII	UBCCT302	Programming in C++	3	0	0	3	80	20	100	40
		UBCCL302	Lab C++	0	0	1	1	40	10	50	17
3	DSC-IX	UBCCT303	Calculus& differential Equation	3	1	0	4	80	20	100	40
4	DSE-I	UBCGT304	Computer Organization &Architecture	3	1	0	4	80	20	100	40
5	SEC-III	UBSEC312	Choose one from pool of SEC	2	0	0	2	40	10	50	17
6	AECC-III	UBCAE	Environmental Studies-I	2	0	0	2	40	10	50	17
7	VAC-III	UBAEC003	Choose one from pool of VAC	2	0	0	2	40	10	50	17
	TOTAL			18	2	2	22	-	-	650	-

BCA- IV Semester

S.No	Course Type	Course-code	Subject	Periods			Credit	Theory Marks	Internal Marks	Total Marks	
				L	T	P				Max	Min
1	DSC-X	UBCCT401	Data Structure	3	1	0	4	80	20	100	40
2	DSC-XI	UBCCT402	DBMS	3	0	0	3	80	20	100	40
		UBCCL402	Lab DBMS	0	0	1	1	40	10	50	17
3	DSC-XII	UBCCT403	Programming in Java	3	0	0	3	80	20	100	40
		UBCCL403	Lab Java	0	0	1	1	40	10	50	17
4	DSE-II	UBCGT404	Computer Network	3	1	0	4	80	20	100	40
5	SEC-IV	UBSEC412	Choose one from pool of SEC	2	0	0	2	40	10	50	17
6	AECC-IV	UBCAE	Environmental Studies-II	2	0	0	2	40	10	50	17
7	VAC-IV	UBAEC002	Choose one from pool of VAC	2	0	0	2	40	10	50	17
	TOTAL			18	2	2	22	-	-	650	-

DSC- Discipline Specific Course,
DSE- Discipline Specific Elective
AEC-Ability Enhancement Core Course,
SEC- Skill Enhancement Course,
GE- Generic Elective,
VAC- Value Added course

MINIMUM PASS MARKS 40%

Section	Maximum Marks (80)		Maximum Marks (40)	
A	2 x 8 = 16	Very short answer type questions consisting 8 questions of 2 marks, two question from each unit.	8 x 5 = 40	8 questions of 8 mark each, out of which any 5 question to be answer.
B	6 x 4 = 24	Short answer type questions consisting 4 questions of 6 marks each, one question from each unit with internal choice.		
C	10 x 4 = 40	long answer (Discreptive) type questions consisting 4 questions of 10 marks each, one question from each unit with internal choice		

SYLLABUS OF 4 YEARS UG PROGRAM (FYUGP) IN COMPUTER APPLICATION, GOVT. DIGVIJAY AUTONOMOUS P G COLLEGE, RAJNANDGAON, AS PER NEP 2020 (SEMESTER-III AND IV)

Program Objective(PO)

Po1- To learn the importance of DBMS in the present scenario and about DBMS architecture, sql to interact with database.

Po2- To learn advanced features of the C++ programming language and the characteristics of an object-oriented programming language: data abstraction and information hiding, inheritance, and dynamic binding of the messages to the methods.

Po3- The purpose of the course is to provide students with an understanding of how to analyze, build, and execute programs using unix shell.

Po4- Prepare the students to provide professional solutions to real time Problems.

Po5- Prepare the students with exceptional skills of problem solving, communication and leadership skills.

Program Specific Outcome (PSO)

PSO1- Student able to enhance their skills in various programming languages.

PSO2- Student should be able to know about Data, Database, Database connection with languages.

PSO3- Students also have their ability in the field of networking.

PSO4- Students can apply their skills in many fields like system analysis, software developing, testing, database management etc.

PSO5- Students can also improve their programs through algorithms.

Department of Computer Application
BCA- III Semester
DSC – VIII Operating System with Linux

Session 2024-25	Programme- UG
Semester – III	Subject- Operating System with Linux
Course Type – DSC	Course Code- UBCCT301
Credit – 3+1=4	Lecture -60
MM – 100	Min Marks-40

Course Title	**OS with Linux**
Course Objective	• To understand concept of Operating system. • Develop Shell scripts to perform more complex task. • UNIX/Linux utilities to create and manage simple file processing operations,organize directory structures with appropriate security.

Course Learning Outcome	After completion of course the students will able to:- • Understand the basics of operating systems like kernel, shell, types and views of operating systems • Describe the various CPU scheduling algorithms and remove deadlocks. • Explain various memory management techniques and concept of thrashing. • Use disk management and disk scheduling algorithms for better utilization of external memory

Unit	Lecture	Contents/Topic	Credits
I	14	**Introduction** Defining operating system, History and Evolution of operating system, **Basic Concepts:** batch processing, spooling, multi-programming, multiprocessor system, time-sharing, real time systems Functions and Goals of operating system.	
II	15	**Process Management** Process concept, Process Control Block, **Process State:** State Transition Diagram, **Scheduling Queues:** Queuing Diagram, Types of Schedulers-contexts switching and dispatcher, various types of CPU scheduling algorithms and their evaluation, multilevel queues and multilevel feedback queues.	04
III	115	**Memory Management** Preliminaries of memory management, Contiguous memory allocation, fragmentation, partition allocation policies, compaction, Non-Contiguous memory allocation, Paging, Segmentation, **Virtual Memory:** Demand paging, Swapping, **Page replacement policies:** FIFO, Optimal, LRU, MRU.	
IV	16	**Introduction to UNIX, Shell Programming** Introduction to Multi-user System, Emergency and history of Unix, Feature and benefits, Versions of Unix. **System Structure:**-Hardware requirements, Kernel and its function, introduction to System calls and shell.**File System:** Feature of Unix File System, Concept of i-node table, links, commonly used commands like who, pwd, cd, mkdir, rm, ls, mv, lp, chmod, cp, grep, sed, awk, pr, lex, yacc, make, etc. Getting started (login/logout). **Vi Editor :-** Intro to text processing, command and edit mode, invoking vi, command structure, deleting and inserting line, deleting and replacing character, searching strings.	
Total	**60**	**04 Unit**	

Books :- 1 Operating System Concepts, Abraham Silberschatz, Peter B. Galvin and Greg Gagne (Wiley India Edition)
2. Modern Operating System, Andrew S.Tanenbaum, (PHI)
3. 3.UNIX Complete Reference

Operating System Lab

1. Scheme of Examination:-

Practical examination will be of 3 hours duration. The distribution of practical marks will be as follows

Program 1	-5
Program 2	-5
Program 3	-5
Viva	-10
(Practical Copy+ Practical Sessional)	-15
Total	**-40**

2. In every program there should be comment for each coded line or block of code.
3. Practical files should contain printed program with name of author, date,path of program, unit no and printed output.
4. All the following programs or a similar type of programs should be prepared.

List of Pratical

1.Change your shell environment-path, home,ifs,mail, psl,ps2,term,logname
   i)   at command line
   ii)   at shell level
   iii)   at login level
2. Change tha wallpaper, scrcen saver in GNOME, KDE.
3. Install Linux with following specifications-usename,password,partions for various directories such as/etc./home,etc.
4. Add a user and password, change the password.
5. Add & remove a group.
6. Create partitions on your disk.
7. Install and configure   (i)printer   (ii) scanner

Using VI editor do the following exercises

1. In a file
      i) replace the words 'has' with 'has not'.
      ii) locate n^{th} character
      iii) Sort lines 21 to 40
2. In a file copy/cut and paste following text-
      i At i^{th} line, n lines to j^{th} line.
      ii Yank a few words
      iii Cut and paste n words to i^{th} position in l^{th} line
3. Open to files 'txtfile'and 'newfile' and copy/cut 5 lines from txtfile and paste them in newfile using vi editor.
4. Open 'txtffile' and copy/cut following and paste to the 'newfile'
      i. l^{th} to the last line in it
5. **Create macro**
      i.   to paste your name at any position in the file.
      ii. to make the lth function key to search for "loop" and copy into the buffer'a'.
       all text following it up to but not including the string "end".
      iii. to remove all leading spaces in a file
      iv. to save and quit vi editor in input mode.

Write commands

    I.   List all files that match a class

    II.   List all files that do not match a class.

    III.   Change the fill permissions

    IV.   Configure or set characteristics of your terminal. Describe any 3.

    V.   Display the lines in a file that contain a particular word.

    VI.   Append the contents of two files in a file JABC.

    VII.   Count the number of files in a directory.

Write shell programs

    i.   Display all the users currently logged in detail with colim headers.

    ii.   List all files in current directory and save the list in a file ABC. Also save the contents of the files in ABC and display the contents in ABC in sorted order.

    iii.   Sort the contents of a file ABC and save it in OABC

    iv.   Display all the users currently logged in detail with column headers.

    v.   To save current date & time, number of files & directories in the current directory and contents of all the files to a single file NFL.

    vi.   To input a number and test whether it is +ve, -ve, or zero.

    vii.   To test whether a filename is a regular file or a directory or of other type

    viii.   To list only the directories in current path.

    ix.   To print the greatest of three numbers.

    x.   To print 12 terms of Fibonacci series.

    xi.   To display all users currently logged in & also check a particular user every 30 seconds until he logs in.

    xii.   To save current date & time, number of files in the current directory and contents of all the files matching a pattern to a single file NPFL.

    xiii.   To display particular messages depending on the weekday.

    xiv.   To display common messages for following group of days- Monday & Wednesday, Tuesday & Thursday and Friday & Saturday and other day.

    xv.   xv. To accept a string from the terminal and echo a suitable message if it doesn't have at least 9 characters.

    xvi.   Write a Shall Script to find the factorial of a number.

    xvii.   Write a Shall Script to swap numbers using third variable.

    xviii.   Write a Shall Script to print prime numbers between 1 to 20.

    xix.   Write a Shall Script to greatest of three numbers.

    xx.   Write a Shall Script to sort the contents of a file XYZ and save it in BCAII

    xxi.   Write a Shall Script to display mathematical table of any number in the format Ex.:-3*1=3

Department of Computer Application
BCA- III Semester
DSC – VIII Programming in C++

Session 2024-25	Programme- UG
Semester – III	Subject- Programming in C++
Course Type – DSC	Course Code- UBCCT302
Credit – 3+1=4	Lecture -60
MM – 100	Min Marks-40

Course Title	Programming in C++
Course Objective	- To understand how C++ improves C with object-oriented features - To learn how to write inline functions for efficiency and performance. - To learn the syntax and semantics of the C++ programming language. - To learn how to design C++ classes for code reuse. - To learn how to implement copy constructors and class member functions & concept of data abstraction and encapsulation.
Course Learning Outcome	After completion of course the students will able to:- - Describe the procedural and object oriented paradigm with concepts of streams, classes, functions, data and objects. - Understand dynamic memory management techniques using pointers, constructors, destructors, etc. - Describe the concept of function overloading, operator overloading, virtual functions and polymorphism. - Classify inheritance with the understanding of early and late binding, usage of exception handling, generic programming. - Demonstrate the use of various OOPs concepts with the help of programs

Unit	Lecture	Contents/Topic	Credits
I	15	Overview of OOP: object oriented paradigms, Benefits and Application of OOP.Overview of C++: History of C++, Data Type: Built in data type, User defined DT, Derived DT, Constants &Variables :Symboic constant, Dynamic Initialization of variable, Refrence Variable, Operator in C++, Control Structure(if, if_else, while, do_while, for, break, continue, switch, goto statement).	04
II	15	Structure definition, defining a structure variable, Accessing structure member, Enumeration data type. Function: Function declaration, calling function, function definition, passing argument to function, passing constant, passing value, reference argument, structure as argument, default argument, Returning values from function, return statement, returning structure variable, return by reference, overloaded function, Inline function.	
III	15	Object, Classes &Inheritance: defining the class& its member, inline function, nesting of member function, object as function argument, memory allocation, Constructor & destructor: Null, Default, parameterized, copy, constructor with default argument, class destructor.	
IV	15	Introduction of pointers, "&" and "*" operator, pointer to object, this pointer, Pointer to derived class, Inheritance, Types of Inheritance, function overriding, Access Specifiers : Public, private, protected.Polymorphism: Dynamic and static polymorphism, Friend function, Friend class, Overloading binary operators using friend function.	
Total	60	04 Unit	

Books :-Object Oriented Programming with C++ : E balagurusamy, The McGraw hill

Lets Us C++: YashwantKantekar, BPB Publication

Programming in C++ Lab

5. In every program there should be comment for each coded line or block of code
6. Practical files should contain printed program with name of author, date, path of program, unit no and printed output.
7. All the following programs or a similar type of programs should be prepared

INPUT AND OUTPUT, FORMATTING

1. Write a program in which you declare variable of all data types supported by C language. Get input from user and print the value of each variable with alignment left, right and column width 10. For real numbers print their values with two digits right to the decimal

LOOPS, DECISIONS

2. Write program to print all combination of 1 2 3.
3. Write program to generate following pattern

   a) A B C D E F G   c)   *
      A B C   E F G   *   *
      A B   F G   *   *   *
      A   G

   b) 1   d)   1
      1 2   1 2 1
      1 2 3   1 3 3 1
      1 2 3 4   1 4 6 4 1

4. Write main function using switch...case, if..else and loops which when called asks pattern type, if user enters 11 then first pattern is generated using for loop. If user enters 12 then first pattern is generated using while loop. If user enters 13 then first pattern is generated using do-while loop. If user enters 21 then a second pattern is generated using for loop and so on.
5. Write program to display number 1 to 10 in octal, decimal and hexadecimal system
6. Write program to display number from one number system to another number system. The program must ask for the number system in which you will input integer value then the program must ask the number system in which you will want output of the input number after that you have to input the number in specified number system and program will give the output according to number system for output you mentioned.
7. Write a program to perform following tasks using switch...case, loops, and conditional operator (as and when necessary).

   a) Find factorial of a number
   b) Print fibonacci series up to n terms and its sum.
   c) Print sin series up to n terms and its sum.
   d) Print exponential series up to n terms and its sum.
   e) Print prime numbers up n terms.
   f) Print whether a given year is leap or not.
8. Write program no. 6 but use library function to perform above tasks.

ARRAY

9. Create a single program to perform following tasks using switch, if else, loop and single dimension character array without using library function.

   a) To reverse the string.
   b) To count the number of characters in string
   c) To copy the one string to other string,
   d) To find whether a given string is palindrome or not.
   e) To count no. of vowels, consonants in each word of a sentence and no of punctuation in sentence
   f) To arrange the alphabets of a string in ascending order.

10. Create a single program to perform following tasks using switch, if..else, loop and single dimension integer array:

    a) Sort the elements.
    c) Search for presence of particular value in array element using linear search.
    d) Search for presence of particular value in array element using binary search.

11. Write a program that read the afternoon day temperature for each day of the month and then report the month average temperature as well as the days on which hottest and coolest days occurred.

12. Create a single program to perform following tasks using switch, if..else, loop and double dimension integer array of size 3x3:

    a) Addition of two matrix.
    b) Subtraction of two matrix.
    c) Multiplication of two matrix.
    d) Inverse of matrix.
    e) Transpose of matrix.
    f) Sum of diagonal elements

13. Create a single program to perform following tasks using switch, if..else, loop and double dimension character array of size 5x40:

    a) Sorting of string.
    b) Finding the largest string.
    c) Finding the smallest string.
    c) Searching for presence of a string in array.

FUNCTIONS

14. Write program using the function power (a, b) to calculate the value of a raised to b.

15. Write program to demonstrate difference between static and auto variable.

16. Write program to demonstrate difference between local and global variable.

17. Write a program to perform following tasks using switch...case, loops and function.

    a) Find factorial of a number
    b) Print Fibonacci series up to n terms and its sum.
    c) Print Sin series up to n terms and its sum.
    d) Print exponential series up to n terms and its sum.

18. Write a program to perform following tasks using switch...case, loops and **recursive** function.

    a) Find factorial of a number
    b) Print Fibonacci series up to n terms and its sum.
    c) Print Sin series up to n terms and its sum.
    d) Print exponential series up to n terms and its sum.
    e) Print natural series up to n terms and its sum

19. Write a function to accept 10 characters and display whether each input character is digit, uppercase letter or lower case letter.

Array & Function

20. Create a single program to perform following tasks using switch, if else, loop, function and double dimension integer array of size 3x3

    a) Addition of two matrix.
    b) Subtraction of two matrix.
    c) Multiplication of two matrix.
    d) Inverse of matrix.
    e) Transpose of matrix.

21. Create a single program to perform following tasks using switch, if else, loop, user defined function and single dimension character array:

    a) To reverse the string.
    b) To count the number of characters in string.
    c) To copy the one string to other string.
    d) To find whether a given string is palindrome or not.
    e) To count no. of vowels, consonant in each word of a sentence and no. of punctuations in sentence.

22. Create a single program to perform following tasks using switch, if else, loop, function and single dimension integer array:

    a) Sort the elements.
    b) Find largest element and smallest element.
    c) Search for presence of particular value in array element using linear search.
    d) Search for presence of particular value in array element using binary search.

POINTER

28. Define union Emp having data members:-one integer, one float and one single dimension character array. Declare a union variable in main and test the union variable.

29. Define an enum Days_of_Week members of which will be days of week. Declare an enum variable in main and test it.

30. Write a program of swapping two numbers and demonstrates call by value and call by reference.

31. Write program to sort strings using pointer exchange.

32. Write a program in c using pointer and function to receive a string and a character as argument and return the no. of occurrences of this character in the string.

33. Create a program having pointer to void to store address of integer variable then print value of integer variable using pointer to void. Perform the same operation for float variable.

34. Write program to find biggest number among three numbers using pointer and function.

35. Write program to Create a structure Employee having data members to store name of employee, employee id, salary. Use Pointer to structure to store data of employee and print the stored data-using pointer to structure.

36. Write program to Create a structure Employee having data members to store name of employee, employee id, salary. Use Pointer to structure to simulate dynamic array of structure store data of n employees and print the stored data of n employees using pointer to structure.

37. Write a program to sort a single dimension array of integers of n elements simulated by pointer to integer. Use function for sorting the dynamic array.

Department of Computer Application
BCA- III Semester
DSC – IX Calculus &Differential equation

Session 2024-25	Programme- UG
Semester - III	Subject- Calculus & Differential equation
Course Type - DSC	Course Code- UBCCT303
Credit – 3+1=4	Lecture -60
MM - 100	Min Marks-40

Course Title	Calculas&Differnential equation
Course Objective	• Evaluate first order differential equations including separable, homogeneous, exact, and linear. • Understand second order and higher order linear differential equations. • Understand differential equations using variation of parameters. • Understand linear systems of ordinary differential equations.
Course Learning Outcome	After completion of course the students will able to:- • Understand the terms 'exponential growth/decay', 'proportionate growth rate' and 'doubling/halving time' when applied to population models, and the terms 'exponential decay', 'decay constant' and 'half-life' when applied to radioactivity • check a solution of a differential equation in explicit or implicit form, by substituting it into the differential equation

Unit	Lecture	Contents/Topic	Credits
I	15	Limits, definition of limits, Continuity of one variable, Types of continiuity, Properties of continous function, Borel'sTheorm, MostestTheorm, Intermediate value theorm, Differentiablity of function(s) of one variable.	04
II	15	Differentiation of function, Differentiation of function of function, parametric function, Product of function, function in product and quotient form,Logarithamic differentiation, differentiation of parametric function, higher order derivatives, maxima & minima.	
III	15	Indefinite Integral, Basic integration formula, Trigonometric integrals, Intergration by parts & substitution. Definite integrals, Introduction properties of define integrals.	
IV	15	Introduction to differential equation, definition, order & degree of differential equation, derivation of a differential equation, separation of variables.	
Total	60	04 Unit	

Books : Calculus & Statistical Analysis : H.K.Pathak
Calculus :B.R.Thakur
Differential Equation :H.K.Pathak

Department of Computer Application
BCA- III Semester
DSE – I Computer Organization & Architecture

Session 2024-25	Programme- UG
Semester - III	Subject- Computer Organization & Architecture
Course Type - DSE	Course Code-
Credit – 3+1=4	Lecture -60
MM - 100	Min Marks-40

Course Title	Computer Organization &Architecture
Course Objective	• Understand concepts of register transfer logic and arithmetic operations. • Explain different types of addressing modes and memory organization. • Learn the different types of serial communication techniques. • Summarize the Instruction execution stages.
Course Learning Outcome	After completion of course the students will able to:- • Define different number systems, binary addition and subtraction, 2's complement representation and operations with this representation. • Understand the architecture and functionality of central processing unit. • Analyze some of the design issues in terms of speed, technology, cost, performance. Analyze some of the design issues in terms of speed, technology, cost, performance.

Unit	Lecture	Contents/Topic	Credits
I	15	Fundamentals of Digital Electronics: Data Types, Complements, Fixed-Point Representation, Floating-Point Representation, Other Binary Codes, Error Detection Codes, Logic Gates, Boolean Algebra, Map Simplification, Combinational Circuits, Flip- Flops, Sequential Circuits, Counters, Multiplexer, Demultiplexer, Decoder, Encoder.	
II	15	Register Transfer and Micro operations: Register Transfer Language, Register Transfer, Bus & Memory Transfer, Arithmetic Microoperations, Logic Microoperations, Shift Microoperation, Instruction codes, Computer Registers, Computer Instructions, Timing & Control, Instruction Cycles, Memory Reference Instruction, Input - Output & Interrupts.	04
III	15	Processor and Control Unit: Hardwired vs. Micro programmed Control Unit, General Register Organization, Stack Organization, Instruction Format, Data Transfer & Manipulation, Program Control, Pipelining – Pipelined data path and control – Handling Data hazards & Control hazards.	
IV	15	Memory and I/O Systems: Peripheral Devices, I/O Interface, Data Transfer Schemes, Program Control, Interrupt, DMA Transfer, I/O Processor. Memory Hierarchy, Processor vs. Memory Speed, High-Speed Memories, Cache Memory, Associative Memory, Interleave, Virtual Memory, Memory Management	
Total	60	04 Unit	

Books : Computer System architecture -- M. Morris Mano
Computer Fundamentals: Architecture and Organization- B.Ram

GOVT. DIGVIJAY AUTONOMOUS P.G. COLLEGE, RAJNANDGAON (C.G.)
FYUGP (CBCS/LOCF Course)
Department – Computer Application

Session: **2024-25**	Program: UG
Semester: **III**	Subject: **Computer Application**
Course Type: **SEC**	Course Code: ....
Course Title:	**Python Programming - I**
Credit: **2**	Lecture: **30**
M.M. 50 = (ESE 40 + IA 10)	Minimum Passing Marks: **40%**

Title	**Python Programming**
Course Learning Outcome:	• Develop and Execute simple Python programs. Structure a Python program into functions. • Using Python lists, tuples to represent compound data Develop Python Programs for file processing

Units	Lectures	Lectures (15 x 2 = 30)	Credits
I	15	Introduction to python, Feature of Python Program. Execution of python program. Program, Writing Our First Python Program, Data types in Python. Python Interpreter and Interactive Mode; Values and Types: int, float, boolean, string, and list; Variables, Expressions, Statements, Tuple Assignment, Precedence of Operators, Comments; Modules and Functions, Function Definition and use, Flow of Execution, Parameters and Arguments .	1
II	15	Operators in Python, Input and Output, Control Statements. Boolean Values and operators, Conditional (if), Alternative (if-else), Chained Conditional (if-elif-else); Iteration: state, while, for, break, continue, pass; . Arrays in Python, Strings and Characters. Strings: String Slices, Immutability, String Functions and Methods, String Module;. Functions, Lists and Tuples. List Operations, List Slices, List Methods ; Tuples: Tuple Assignment, Tuple as Return Value;	1

TEXT BOOKS
- Mark Lutz, Learning Python
- Tony Gaddis, Starting Out With Python

Session: **2024-25**	Program: UG
Semester: **III**	Subject: **Computer Application**
Course Type: **VAC**	Course Code: ....
Course Title:	**Cyber Security - I**
Credit: **2**	Lecture: **30**
M.M. 50 = (ESE 40 + IA 10)	Minimum Passing Marks: **40%**

Title	Cyber Security - I
Course Learning Outcome:	After completion of course the students will able to:- • Measure the performance and troubleshoot Cyber security systems. • Implement Cyber security solutions. • Be able to use Cyber security, information assurance and Cyber /computer forensics software tool. • Identify the key cyber security vendors in the marketplace. • Design & develop a security architecture for an organization.

Units	Lectures	Lectures (15 x 2 = 30)	Credits
I	15	Network, Types of Network : LAN, MAN, WAN, PAN Computer security, WWW, IP Address Classes, Protocols: IP, HTTP, TCP, FTP, ARP Threats, Harm, Vulnerabilities, Control, Authentication, Access control and cryptograph. Web Attack : Browser attack, Web attack targeting users, obtaining user or website data.	1
II	15	Network Security: Introduction of Network Security and its importance. Cryptography Firewall: Introduction, Linux Firewall, Windows Firewall, Packet, VPN: the basic of Virtual Private Networks. Network Address Translation (NAT)	1

Department of Computer Application
BCA- IV Semester
DSC - X Data structure

Session 2024-25
Semester - IV
Course Type - DSC
Credit - 3+1=4
MM - 100

Programme- UG
Subject- Data structure
Course Code- UBCCT401
Lecture -60
Min Marks-40

Course Title	**Data Structure**
Course Objective	The objective of the course is to present an introduction to analyse the asymptotic performance of algorithms. Write rigorous correctness proofs for algorithms and to Demonstrate a familiarity with major algorithms and data structures
Course Learning Outcome	After completion of course the students will able to - • Understand the basic concept of data structure • Describe the basics of array, record and pointers • Understand and implement the uses of linked list, stack and queue. • Understand and implement the uses of trees. Understand and implement the uses of various searching and sorting algorithm

Unit	Lecture	Contents/Topic	Credits
I	15	**UNIT-I: INTRODUCTION:** Introduction, Basic terminology, Elementary data organization, Data structure, Data structure operation, Algorithms: complexity, time-space Tradeoff. Mathematical Notation and functions, Algorithmic Notation	
II	15	**UNIT — II CONCEPT OF ARRAYS, RECORDS AND POINTERS:** Linear Array; Single Dimensional Array, Multidimensional Array, Static Array, Dynamic Array; **Pointers:** Introduction of Pointer, **Records:** Record Structures	04
III	15	**UNIT — III LINKED LISTS, STACKS, QUEUES, RECURSION:** Link lists, traversing a linked list, searching a linked list; Insertion into a linked List, Deletion from a Linked List, Stacks, Array Representation of Stack; Queues.	
IV	15	**UNIT—IV TREES and SORTING/SEARCHING:** Binary Trees, Representing Binary Trees in Memory, Traversing binary tree, Traversal Algorithms using stacks, header nodes; threads, Binary Search Tree, Searching and Inserting in Binary Search Tree, Deleting in Binary Search tree. **Sorting:** Bubble Sort, Quick Sort, Insertion Sort, Selection Sort, Merge Sort; **Searching:** Liner Search, Binary Search, Searching and data modification, Introduction to hashing.	
Total	60	**04 Unit**	

Books :- Data Structure - Seymour Lipschutz (Schaum's Series).
Data Structure & Program Design - Robert L. Kruse, 3" Ed., Prentice Hall.

Department of Computer Application
BCA- IV Semester
DSC – XI Programming in Java

Session 2024-25	Programme- UG
Semester - IV	Subject- Programming in Java
Course Type - DSC	Course Code- UBCCT402
Credit – 3+1=4	Lecture -60
MM - 100	Min Marks-40
Course Title	Programming in Java
Course Objective	• This course intends to provide in-depth knowledge of Object oriented programming using Java • To solve real-life problems through software development using Java.
Course Learning Outcome	After completion of course the students will able to:- • Understand the concepts of basics of Java programming Language and get hands on with selection and iterative building blocks for coding. • Understand and implement the concept of Inheritance, Interface and packages in java. • Understand and implement the exception handling and multithreading mechanism using java. • Describe basics of input-output streams and JDBC programming in java • Describe fundamental of software development using the concept of Applet and AWT in java

Unit	Lecture	Contents/Topic	Credits
I	15	**UNIT – I : Introduction** History of java, C++ verses Java, features of java, data types, control structures: if else, switch case, looping statement: while, do while, for loop, new version of for loop, break, continue statement, arrays and its types , , string and String Buffer class, Wrapper Classes, vectors.	
II	15	**UNIT – II:** Basics of class and object, constructor and its types, methods and its types, method overloading, this keyword. **Inheritance:** Basics types, method Overriding, using abstract classes, uses of final keyword final classes, using super. **Packages and Interfaces:** Defined CLASSPATH, importing packages, implementing interface	04
III	15	**UNIT – III :** **Exception Handling: Basics of** Exception handling, types of exception, using try and catch, throwing exceptions, user defined exceptions, finally, throw verses throws. **Multithreaded Programming:** Java thread model, thread life cycle. Various functions of Thread class and Runnable interface, creating threads, and thread priorities, synchronization. Inter thread communication.	
IV	15	**UNIT – IV:** **Input/Output:** Basic of Streams, Byte and Character Stream, IO stream package, predefined streams, reading and writing from console and reading and writing from files. **Applets:** Fundamentals, life cycle, overriding update, HTML APPLET tag, passing parameters. Developing single applets **Introduction to AWT:** Window fundamentals, creating windowed, programs working with graphics, using AWT controls	

Books :- 1. JAVA COMPLETE REFERENCE - BY HERBERT SCHILDT
2. PROGRAMMING WITH JAVA - BY E. BALAGURUSAMY
3. JAVA PROGRAMMING - KHALID MUGHAL

Programming in Java Lab

1. **Scheme of Examination:-**

Practical examination will be of 3 hours duration. The distribution of practical marks will be as follows

Program 1	-5
Program 2	-5
Program 3	-5
Viva	-10
(Practical Copy+ Practical Sessional)	-15
Total	**-40**

2. In every program there should be comment for each coded line or block of code.
3. Practical files should contain printed program with name of author. date. path of program. unit no and printed output.
4. All the following programs or a similar type of programs should be prepared.

List of Practical:

Java Programs to implement the basics of Java.

1. WAP that implements the Concept of Encapsulation.
2. WAP to demonstrate concept of Polymorphism (Overloading and Overridding)
3. WAP the use Boolean data type and print the Prime number Series up to 50.
4. WAP for matrix multiplication using input/output Stream.
5. WAP to add the elements of Vector as arguments of main method (Run time) and rearrange them, and copy it into an Array.
6. WAP to check that the given String is palindrome or not.
7. WAP to arrange the String in alphabetical order.
8. WAP for String Buffer class which perform the all methods of that class.
9. WAP to calculate Simple Interest using the Wrapper Class.
10. WAP to calculate Area of various geometrical figures using the abstract class.
11. WAP where Single class implements more than one interfaces and with help of interface reference variable user call the methods.
12. WAP that use the multiple catch statements within the try-catch mechanism.
13. WAP where user will create a self-Exception using the "throw" keyword.
14. WAP for multithread using the isAlive(), join() and synchronized() methods of Thread class.
15. WAP to create a package using command and one package will import the another package.
16. WAP for AWT to create Menu and Popup Menu for Frame.
17. WAP for Applet that handle the KeyBoard Events.
18. WAP, which support the TCP/IP protocol, where client gives the message and server will be, receive the message.
19. WAP to illustrate the use of all methods of URL class.
20. WAP for JDBC to insert the values into the existing table by using prepared Statement.
21. WAP for JDBC to display the records from the existing table.
22. WAP to demonstrate the Border Layout using applet.
23. WAP for Applet who generate the MouseMotionListener Event.
24. WAP for display the checkboxes, Labels and TextFields on an AWT.
25. WAP to calculate the Area of various geometrical figures using the abstract class.
26. WAP for creating a file and to store data into that file.(Using the FileWriterIOStream)
27. WAP to display your file in DOS console use the Input/Output Stream.
28. WAP to create an Applet using the HTML file, where Parameter Pass for font Size and Font type and Applet message will change to corresponding parameters.

Session 2024-25	Programme- UG
Semester - IV	Subject- DBMS
Course Type - DSC	Course Code- UBCCT403
Credit – 3+1=4	Lecture -60
MM - 100	Min Marks-40

Course Title Course Objective	**Database Management System(DBMS)** • To recognize the importance of database analysis and design in the implementation of any Database application and to understand the process of drawing the ER-Diagrams. • It also gives the knowledge of the roles of transaction processing and concurrency control.
Course Learning Outcome	After completion of course the students will able to:- • Understand the basic principles of database management systems. • Understand Entity-Relationship diagrams to represent simple database application scenarios . • Understand the concept of database language. • Discuss normalization techniques with simple examples. • Describe transaction processing and concurrency control concepts.

Unit	Lecture	Contents/Topic	Credits
I	15	Overview of Database Management Data Information and knowledge. data processing verses data management,file oriented approach verses database oriented approach to data management data independence database administration roles. DBMS architecture, different kinds of DBMS users. Importance of data dictionary contents of data dictionary, Types of database languages Data models network, hierarchical, relational model.	04
II	15	Relational Model& Relational Algebra Entity -Relationship model, attributes and relationships. ER diagrams Concept of Keys: Primary Key, Candidate key, Foreign key, Super key, Converting ER model into relational schema, Extended ER features. Introduction to UML Representation in CMI diagram (Class Diagram ate)	
III	15	Relational Algebra & Relational Calculas, StructuredOuery Language (SQL), Normalization concept in logical model. Pitfalls in database design update anomalies Functional dependencies Join dependencies Normal forms (INF,2 NF,3 NF) Boyce Codd Normal form. Decomposition, Multi-Valued Dependencies 4NF, 5NF De-normalization	
IV	15	Introduction to SQL constructs SELECT,FROM,WHERE, GROUP BY, HAVING.. ORDERBY INSERT. DELETE,UPDATE,DROP,VIEW definition and use. Nested Query and correlated nested query. Integrity constraints (Not null, unique, check, primary key foreign key, references Inner and Outer Joins Query Processing: Parsing. translation. Optimization evaluation and overview of query processing, Protecting the Data Base: Integrity Security and Recovery Domain constraints. Referential Integrity ,Authorization in SOL	
Total	60	04 Unit	

Books :-Database system concept : H F Korth& S Sudarshan
SQL, PLSQl : BPB Publication

UBCCL403 :-DBMS Lab

1. Scheme of Examination:-

Practical examination will be of 3 hours duration. The distribution of practical marks will be as follows

Program 1	-5
Program 2	-5
Program 3	-5
Viva	-10
(Practical Copy+ Practical Sessional)	-15
Total	**-40**

2. In every program there should be comment for each coded line or block of code.
3. Practical files should contain printed program with name of author, date, path of program, unit no and printed output.
4. All the following programs or a similar type of programs should be prepared.

List of Practical of SQL (LAB – DBMS)

1. Using the following database,
   - Colleges (**cname**, city, address, phone, afdate)
   - Staffs (**sid**, sname, saddress, contacts)
   - StaffJoins(sid, cname, dept, DOJ, post, salary)
   - Teachings (sid, class, paperid, fsession, tsession)
   - Subjects (**paperid**, subject, paperno, papername)

Write SQL statements for the following –
   1. Create the above tables with the given specifications and constraints.
   2. Insert about 10 rows as are appropriate to solve the following queries.
   3. List the names of the teachers teaching computer subjects.
   4. List the names and cities of all staff working in your college.
   5. List the names and cities of all staff working in your college who earn more than15,000
   6. Find the staffs whose names start with 'M' or 'R' and ends with 'A' and/or 7 characters long.
   7. Find the staffs whose date of joining is2005.
   8. Modify the database so that staff N1 now works in C2College.
   9. List the names of subjects, which T1 teaches in this session or all sessions.
   10. Find the classes that T1 do not teach at present session.
   11. Find the colleges who have most number of staffs.
   12. Find the staffs that earn a higher salary who earn greater than average salary of their college.
   13. Find the colleges whose average salary is more than average salary ofC2

2. Create the following database,
   - Enrollment (**enrollno**, name, gender, DOB, address, phone)
   - Admission (**admno**, enrollno, course, yearsem, date, cname)
   - Colleges (**cname**, city, address, phone, afdate)
   - FeeStructure (**course, yearsem**, fee)
   - Payment (**billno**, admno, amount, pdate, purpose)

   1. Create the above tables with the given specifications and constraints.
   2. Insert about 10 rows as are appropriate to solve the following queries.
   3. Get full detail of all students who took admission this year class wise
   4. Get detail of students who took admission in Bhilai colleges.

5. Calculate the total amount of fees collected in this session
    i)   By your college ii) by each college iii) by all colleges

6. List the students who have not payed full fee
    i) in your college ii) in all colleges

7. List the number of admissions in your class in every year.

8. List the students in the session who are not in the colleges in the same city as they live in.

9. List the students in colleges in your city and also live in your city.

3. Create the following database,
   Subjects (paperid, subject, paper, papername)
   Test (paperid, date, time, max, min)
   Score (rollno, paperid, marks, attendence)
   Students (admno, rollno, class, yearsem)

   1. Create the above tables with the given specifications and constraints.
   2. Insert about 10 rows as are appropriate to solve the following queries.
   3. List the students who were present in a paper of a subject.
   4. List all roll numbers who have passed in first division.
   5. List all students in BCA-II who have scored higher than average
       i) in your college ii) in every college
   6. List the highest score, average and minimum score in BCA-II i) in your college ii)in
   every college
   7. Write a Sql Query to find out third Highest marks of Student.

4. Create the following database.
                Product (pid, p_name, price, Qty)
                Customer(C_id , c_name, pid , pro_qty, mobile_no)

   1. Create the above tables with the given specifications and constraints.
   2. Insert about 10 rows as are appropriate to solve the following queries.
   3. Write a sql query to find out average price of product.
   4. WAS to find out total number of product.
   5. WAS to find out sum of price which quantity is more than 20.
   6. list of all customer, c_id whose purchase same product.
   7. WAS to list all product in descending order.

Department of Computer Application
BCA- IV Semester
DSE – II Computer Network

Session 2024-25	Programme- UG
Semester – IV	Subject- Computer Network
Course Type - DSE	Course Code- UBCGT404
Credit – 3+1=4	Lecture -60
MM – 100	Min Marks-40

Course Title	**Computer Network**
Course Objective	• Identify the different types of network topologies and protocols. • Understand fundamental concept of networking. • Understand OSI and TCP/IP model. Understand different kinds of modes.
Course Learning Outcome	After completion of course the students will able to:- • To Establish Network connection in local area also metropolitan area network. • Understand fundamental concepts in Routing, Addressing & working of Transport Protocols. • Understand Wireless LANs & Wireless Sensor Networks Operation. • Understand the concepts of Data Communication.

Unit	Lecture	Contents/Topic	Credits
I	15	**Introduction to Computer Networking** Data Communication, Networks – Distributed Processing, Network Criteria, Applications; Protocols and Standards, Standard Organization, Line Configuration – Point to Point, Multi Point; Topology – Mesh, Star, Tree, Bus, Ring, Hybrid; Transmission mode, Categories of Network – LAN, MAN, WAN, Inter Networks, Error detection and correction, hamming code, Router, gateway, Modem, Bridge.	04
II	15	**Transmission of Digital Data** Analog and Digital, digital data transmission – parallel transmission, serial transmission, DTE-DCE interface – data terminal equipment, data circuit terminating equipment, standards, modems Transmission rate, Modem standards. Multiplexing technique - FDM, TDM, switching technique- Circuit Switching, Packet Switching.	
III	15	**The OSI Model & TCP/IP Model** ISO organization, The model – Layered architecture, functions of the layers – Physical layer, Data Link layer, Network layer, Transport layer, session layer, Presentation layer, Application layer. The TCP/IP reference model, comparison of TCP/IP & OSI, Introduction to Internet – ARPANET, Architecture of Internet, Client server model, WWW, IP Address Classes, Protocols: IP, HTTP, TCP, FTP, ARP.	
IV	15	**Network Security:** Introduction of Network Security and its importance. Cryptography: Definitions, Symmetric Key Cryptography: Traditional Ciphers, Simple modern Ciphers, DES (Data encryption system) Asymmetric Key Cryptography: RSA, Security Services, Digital Signatures.	
Total	60	**04 Unit**	

Books :- 1. Introduction to Data communication & Networking – Behrouz &Forouzan
2. Computer Networking – Andres & Tanenbaum

GOVT. DIGVIJAY AUTONOMOUS P.G. COLLEGE,
RAJNANDGAON (C.G.)
FYUGP (CBCS/LOCF Course)
Department: .Computer Application

Session: **2024-25**	Program: UG
Semester: **IV**	Subject: **Computer Application**
Course Type: **SEC**	Course Code: ....
Course Title:	**Python Programming - II**
Credit: **2**	Lecture: 30
M.M. 50 = **(Internal 10 + Practical Record – 20 + Practical 10 + Viva 10)**	Minimum Passing Marks. **40%**

Title	**Python Programming - II**
Course Learning Outcome:	• Understand the gruitful function local & global scope • Understand the advance uses of list in Python. • Understand the knowledge of Dictionaries. • Practical knowledge of Python Programming.

Units	Lectures	Lectures (15 x 2 = 30)	Credits
I	15	Fruitful Functions: Return Values, Parameters. Local and Global Scope, Advanced List Processing - List Comprehension. Cloning Lists. List Parameters; Lists as Arrays. List Loop. Mutability, Aliasing. Dictionaries: Operations and Methods:	1

Practical : Python Programming -II LAB   **Lecture -15**
Credit = 1

1. Write a program that reads an integer value and prints leap year or not a leap year.

2. Write a program to create the following Pattern . For example enter a size: 5 -

```
*
**
***
****
*****
```

3. Write a function that takes an integer n as input and calculates the value of 1 - 1/2! + 1/n!

4. Write a function that takes an integer input and calculates the factorial of that number.

5. Write a function that takes a string input and checks if it is a palindrome or not.

6. Write a list function to convert a string into a list, as in list which gives [a, e, c].

7. Write a program to generate Fibonacci series.

8. Write a program to check whether the input number is even or odd.

9. Write a program to compare three numbers and print the largest one.

10. Write a program to print factorial value of a given number.

11. Write a program to to determine whether the number is prime or not.

12. Write a program to create Stack Class and implement all its methods. Use Lists.

13. Write a program to create Queue Class and implement all its methods. Use Lists.

14. Write a program to implement linear and binary search on lists.

15. Write a program which will find all such numbers which are divisible by 7.

16. Write a program to check whether a number is palindrome or not.

17. Write a program that accepts a sentence and calculate the number of letters and digits.

Note: The teachers concern can add more program as per requirement.

TEXT BOOKS
- Mark Lutz. Learning Python
- Tony Gaddis. Starting Out With Python
- Kenneth A. Lambert. Fundamentals of Python
- James Payne. Beginning Python using Python 2.6 and Python 3

Reference Book
- Problem Solving using Python – E. Balagurusamy, Mc Graw Hill Education Ltd., 2017
- Practical Programming An Introduction to Computer Science Using Python - Jennifer Campbell
- https://docs.python.org/3/tutorial/index.html

Session: **2024-25**

Semester: **IV**

Course Type: **VAC**

Course Title:

Credit: **2**

M.M. 50 = **(Internal 10 + Practical Record – 20 + Practical 10 + Viva 10)**

Program: UG

Subject: **Computer Application**

Course Code: ....

Cyber Security - II

Lecture: **30**

Minimum Passing Marks: **40%**

Title	Cyber Security - II
Course Learning Outcome:	After completion of course the students will able to:- • Develop skill in Cyber security tools. • Evaluate and communicate the human role in security • systems with an emphasis on ethics, social engineering vulnerabilities and training • Interpret and forensically investigate security incidents. • Test and evaluate secure software. • Implement Cyber security solutions. • Be able to use Cyber security, information assurance and Cyber/computer forensics software tool.

Practical : Cyber Security – II LAB   **Lecture - 30**   **Credit = 2**

Topic of Practical :-

1. Configuring security settings in Mobile Wallets and UPIs.
2. Checklist for secure net banking.
3. Installation and configuration of computer Anti-virus.
4. Wi-Fi security management in computer and mobile.
5. Managing Application permissions in Mobile phone/computer.
6. Managing system security in mobile phone and computer.
7. Configuring Application lock on mobile phone.
8. Configuration and setting of firewall.
9. Internet Browser security setting.
10. Secure use of Anydesk and Shareit software.
11. How to check website IP address.
12. Identifying harmful cookies.
13. How to remove Virus from System.
14. How to check System IP address.
15. Creating user account, setting permission and protecting files.