DEPARTMENT OF COMPUTER SCIENCE

COURSE CURRICULUM & MARKING SCHEME

BCA PART - II & III

(BACHELOR OF COMPUTER APPLICATION)

SESSION : 2022-23

ESTD: 1958

GOVT. V.Y.T. PG AUTONOMOUS COLLEGE, DURG, 491001 (C.G.)

(Former Name – Govt. Arts & Science College, Durg)

NAAC Accredited Grade A^+, College with CPE - Phase III (UGC), STAR COLLEGE (DBT)

Phone : 0788-2212030

Website - www.govtsciencecollegedurg.ac.in, Email – autonomousdurg2013@gmail.com

BCA-II

DEPARTMENT OF COMPUTER SCIENCE
GOVT. V.Y.T. PG. AUTONOMOUS COLLEGE DURG

Approved syllabus for BCA by the members of Board of Studies for the Session 2022-23

BCA PART-II:

PAPER I: (BCA- 201)	**CALCULUS AND DIFFERENTIAL EQUATIONS**
PAPER II: (BCA- 202)	**DATABASE MANAGEMENT SYSTEM**
PAPER III: (BCA- 203)	**PROGRAMMING IN C++**
PAPER IV: (BCA- 204)	**COMPUTER NETWORKS**
PAPER V: (BCA- 205)	**OPERATING SYSTEM WITH LINUX**
PAPER VI: (BCA- 206)	**FOUNDATION COURSE**
PRACTICAL I: (BCA- 207)	**PRACTICAL LAB IN PROGRAMMING IN C++**
PRACTICAL II: (BCA- 208)	**PRACTICAL LAB IN DATABASE MANAGEMENT SYSTEM**
PRACTICAL III: (BCA- 209)	**PRACTICAL LAB IN OPERATING SYSTEM**

Name and Signatures

V.C. Nominee .....

Subject Expert ..... (D.P.Rao)

Subject Expert.....

Alumni(member).....

Prof. from other Dept. of Sc. Faculty .....

Specialist from Industry .....

Departmental members

1. **HOD - Mr. Durgesh Kumar Kotangle**.....
2. **Mr. Dileep Kumar Sahu** .....
3. **Mrs. Latika Tamrakar**.....

SYLLABUS FOR EXAMINATION: (2022-23)
BCA PART-II

Subject Code	Subject Paper	Theory Marks		Internal Marks		Teaching Load per Week		
						L	T	P
		Max. (A)	Min. (B)	Max. (C)	Min. (D)			
BCA 201	Calculus and Differential Equations	80	27	20	8	4	2	-
BCA 202	Database Management System	80	27	20	8	4	2	-
BCA 203	Programming in C++	80	27	20	8	4	2	-
BCA 204	Computer Networks	80	27	20	8	4	2	-
BCA 205	Operating System with Linux	80	27	20	8	4	2	-
BCA 206	Foundation Course	80	27	20	8	4	2	-
BCA 207	LAB IV: Programming Lab in 'C++'	100	50	40	16	-	-	3x2
BCA 208	LAB V: Database Management System Lab	100	50	40	16	-	-	2x2
BCA 209	LAB VI: Operating System Lab	100	50	20	8	-	-	1x2
TOTAL		780	312	220	88			
GRAND TOTAL		(A+C) 1000		(B+D) 400				

NOTE- Student will have to pass individually in all theory, practical and sessional.

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5. Mr. Dileep Kumar Sahu .....
6. Mrs. Latika Tamrakar.....

GOVT. V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)
SYLLABUS FOR: (2022-23)
BCA – PART II

Calculus and Differential Equations

Course Code– BCA-201

Max Mark: 80 **Min Marks: 27**

Note: The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. Only Simple calculators allowed not scientific calculator.

Course Objective:

1. Evaluate first order differential equations including separable, homogeneous, exact, and linear.
2. Solve second order and higher order linear differential equations.
3. Solve differential equations using variation of parameters.
4. Solve linear systems of ordinary differential equations.

Course Outcomes:

1. Recognize differential equations that can be solved by each of the three methods – direct integration, separation of variables and integrating factor method – and use the appropriate method to solve them
2. use an initial condition to find a particular solution of a differential equation, given a general solution
3. check a solution of a differential equation in explicit or implicit form, by substituting it into the differential equation
4. 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
5. Solve problems involving exponential growth and decay.

Differentiation

UNIT-I

Limits-Definition of limits, Continuity of one variable, Types of continuity, Properties of continuous function: Borel's Theorem, Boundedness Theorem, Mostest Theorem, Intermediate value theorem, Differentiability of function(s) of one variable.

UNIT-II

Differentiation of Functions, Differentiation of functions of functions, parametric functions, product of functions, function in Product and quotient form, Logarithmic differentiation, Differentiation of Parametric functions. Higher order derivative, Maxima and Minima

Integration:

UNIT-III

Indefinite Integral- Basic integration Formulas, Trigonometric Integrals, Integration by Parts, Integration by substitution

UNIT-IV

Definite Integrals- Introduction, Properties of definite integrals, Problem based on properties of definite integrals

Differential Equation

UNIT-V

Introduction to differential equation: Definition, order and degree of differential equation, derivation of a differential equation, general and particular solution of differential equation, separation of variables.

TEXT BOOK:

1. Calculus and Statistical Analysis : H.K. Pathak
2. Calculus : B.R. Thakur
3. Differential Equation : H.K. Pathak

REFERENCE:

1. Differential Calculus : Gorakh Prasad
2. Differentiation & Integration : H.K. Pathak
3. Integral Calculus : Gorakh Prasad
4. Differential Equation : Gorakh Prasad
5. Calculus : Rey & Sharma

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GOVT. V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)
SYLLABUS FOR: (2022-23)
BCA – PART II

Database Management System

Course Code– BCA-202

Max Mark: 80 **Min Marks: 27**

Note: The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. Only Simple calculators allowed not scientific calculator.

Course Objectives:
The objective of the course is to present an introduction to database management systems, with an emphasis on how to organize, maintain and retrieve - efficiently, and effectively - information from a DBMS.

Course Outcomes:
1. Knowledge & Understanding: Databases and their design & development
2. Intellectual Cognitive/ analytical skills: Normalization of Databases.
3. Practical Skills: Using SQL and PL/SQL.
4. Transferable skills: Usage of DBMS design and administration.
5. Gather data to analyze and specify the requirements of a system.
6. Design system components and environments.
7. Build general and detailed models that assist programmers in implementing a system.

UNIT-I: Overview of Database Management
Data. Information and knowledge, increasing use of data as a corporate resource, 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.

UNIT-II: Relational Model & Relational Algebra
Entry-Relational model as a tool for conceptual design-entities, attributes and relationships. ER diagrams; Concept of keys, Case studies of ER modeling Generalization; specialization and aggregation converting an ER model into relational schema. Extended ER features. Introduction to UML, Representation in UML, diagram (Class Diagram etc.)

UNIT-III: Relational Model & Relational Design
Relational Algebra: select, project, cross product different types of joins(inner join, outer joins, self-join); set operations, Tuple relational calculus, Domain relational calculus, Simple and complex queries using relational algebra, stand alone and embedded query languages

UNIT-IV: Structured Query Language (SQL)
Normalization concept in logical model; Pitfalls in database design, update anomalies: Functional dependencies, Join dependencies, Normal forms(1NF,2NF,3NF), Boyce Codd Normal form, Decomposition, Multi-Valued Dependencies, 4NF, 5NF, De-normalization.

UNIT-V: Query Processing and Security
Introduction to SQL, constructs (SELECT-----FROM, WHERE----GROUP BY---HAVING------ ORDERBY------) INSERT, DELETE, UPDATE, DROP, VIEW definition and use, Temporary tables, Nested queries and correlated nested queries, 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, Assertion, Triggers, Security & Authorization in SQL.

BOOKS RECOMMENDED:

1. **Database System Concept:** *A. Silberschatz, H. F. Korth and S. Sudarshan, TMH*
2. **Fundamentals of database Systems**: *Elmasri & Nawathe, pearson Education*
3. **An Introduction to Database Systems:** *C.J. Date, AWL publishing Company*
4. **SQL, PL/SQL**: *Ivan Bayross, BPB Publication*
5. **An Introduction to Database Systems**: *Bipin Desai, Galgotia publication.*
6. **Datebase Management System:** *A. K. Majumdar & P. Bhattacharya, TMH.*

Name and Signatures

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Subject Expert.....	**2. Mr. Dileep Kumar Sahu** .....
Alumni(member).....	**3. Mrs. Latika Tamrakar**.....
Prof. from other Dept. of Sc. Faculty	
Specialist from Industry	

GOVT. V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)
SYLLABUS FOR: (2022-23)
BCA – PART II
Course Code– BCA-203
Programming in "C++"

Max Mark: 80 **Min Marks: 27**

Note: The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. Only Simple calculators allowed not scientific calculator.

Course Objectives	Course Outcomes
This course intends to provide in-depthknowledge of Object oriented programming using C++.	**On successful completion of the course, the student will be able to:** **CO1:** Discuss the concepts of programming designing and get hands on with selection and iterative building blocks for coding **CO2:** Describe modular programming approach and learn user define derived data types **CO3:**Discuss object oriented programming concepts and features of OOPs by implementing using C++ **CO4:** Describe pointers and their usage using C++ along with handling exception **CO5:** Describe Inheritance in C++ and basic programming in Java.

UNIT-I: Language Fundamental

Overview of OOP: The Object Oriented paradigm, Basic concepts of OOP, Benefits of OOP, Object oriented languages. Application of OPP.

Overview of C++: History of C++, **Data types:** Built-in data types, User-defined data types, derived data types, **Constant and Variables:** symbolic constants, Dynamic initialization of variable, Reference variable Operators in C++, **Control Structures:** if-else, while, do- while, for break, continue, switch, and go-to statement.

UNIT-II: Structure & Function

Structure: A Simple structure, defining a structure variable, Accessing structure's member, Enumeration data type.

Function: Function Declaration, Calling Function, Function Definition, **passing Arguments 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.

UNIT-III: Object Classes and Inheritance

Object and class, Defining the class and its member, Making an outside function inline, nesting of member function, array as class member, structure and classes.

Memory allocation: memory allocation for objects, new and delete operator, static data member, static member function, object as function as function argument.
Constructor & Destructor: Null and default constructor, parameterized constructor, with default argument, copy constructor, class destructors.

UNIT-IV: Polymorphism and Pointer

Dynamic polymorphism: Virtual function, pure Virtual Function, Abstract class.
Static polymorphism: Operator keyword, overloading unary operators (++ (pre increment and post increment), --) using operator function, overloading binary operators (+, -, =, >=, <=,+=, <, >,II) Friend function, Friend class, overloading, binary operators using friend function.
Pointers: Introduction, & and * operator, pointer to object, this pointer, pointer to derived class.

UNIT-V: Inheritance in C++ and Overview of Java

Inheritance: Introduction to inheritance, Types of inheritance, function overriding, Constructor in Derived class, **Access specifiers:** public, private, protected.
Introduction to Java, Features of Java., data types, control structures, arrays, methods and classes, , string and String Buffer class, Wrapper Class, vectors,

RECOMMENDED BOOKS:

2. **Object Oriented programming with C++:** E. Balagurusamy, The McGraw-Hill
2. **Let Us C++**: Yesvant Kanetkar, BPB Publications
3. **The C++ programming Language:** Bjarne, Stroustrup, Addision Wasley.
4. **Object Oriented programming in C++**:Robert Lafore, Galgotia publications.
5. JAVA PRIMER - BY E. BALAGURUSWAMI

Name and Signatures

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GOVT. V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)
SYLLABUS FOR: (2022-23)
BCA – PART II

Computer Network

Course Code– BCA-204

Max Mark: 80 **Min Marks: 27**

Note: The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. Only Simple calculators allowed not scientific calculator.

Course Objectives:

Learning about computer network organization and implementation, obtaining a theoretical understanding of data communication and computer networks, and gaining practical experience in installation, monitoring, and troubleshooting of current LAN systems.

Course Outcomes:

1. State the fundamentals related to network security and basics of IPv6 and IPsec.
2. Explain various protocols related to internet key exchange.
3. Study Adhoc network and its protocols.
4. Define various examples of wireless communication system, standards related to 2G and 3G wireless networks.

UNIT – I 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.

UNIT – II

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.

UNIT – III

The OSI 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.

UNIT – IV

TCP/IP Model & Protocols

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.

UNIT – V Network Security

Introduction of Network Security and its importance. **Cryptography:** Definitions, **Symmetric Key Cryptography:** Traditional Ciphers, Simple modern Ciphers, **Asymmetric Key Cryptography: RSA,** Security Services, Digital Signatures.

BOOKS RECOMMENDED;

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

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GOVT. V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)
SYLLABUS FOR: (2022-23)
BCA – PART II

Operating Systems with Linux

Course Code– BCA-205

Max Mark: 80 **Min Marks : 27**

Note: The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. Only Simple calculators allowed not scientific calculator.

Course Objectives:
Identify and use UNIX/Linux utilities to create and manage simple file processing operations, organize directory structures with appropriate security, and develop shell scripts to perform more complex tasks.

Course Outcomes:
1. Understand the basics of operating systems like kernel, shell, types and views of operating systems
2. Describe the various CPU scheduling algorithms and remove deadlocks.
3. Explain various memory management techniques and concept of thrashing.
4. Use disk management and disk scheduling algorithms for better utilization of external memory.
5. Recognize file system interface, protection and security mechanisms.
6. Explain the various features of distributed OS like Unix, Linux, windows etc.

UNIT – I : 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.

UNIT – II : Process Management
Process concept, Process Control Block, **Process State:** State Transition Diagram, **Scheduling Queues :** Queuing Diagram, Types of Schedulers-context switching and dispatcher, various types of CPU scheduling algorithms and their evaluation, multilevel queues and multilevel feedback queues.

UNIT – III : 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.

UNIT – IV: Introduction to UNIX

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.

UNIT – V: Shell Programming

Introduction to shell feature, wild card characters, i/out re-directions, standard error redirection, system and user created shell variables, profile files, pipes/tee, background processing, command line arguments, command substitution, read statements, conditional execution of commands, special shell variables $ #, #?, $* etc. Shift commands, loops and decision making for, while and until, choice making using case …. esac, decision making if …. Fi, using test, string comparison, numerical comparison, logical operation, using expr.

BOOKS RECOMMENDED:

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

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GOVT. V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)
SYLLABUS FOR: (2022-23)
BCA – PART II
Course Code – BCA-206
Foundation Course

Max Mark : 80 **Min Marks : 27**

Note : The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. Only Simple calculators allowed not scientific calculator.

Course Objectives:

This course is designed to make the students acquainted with Indian –History and Culture. To make students aware of their fundamental rights & duties and to have the knowledge of parliamentary form of Government. To groom student and develop their professional skill.

Course Outcomes:

1. Students will be able to understand about the Indian history of arts, sculpture archeology, iconography & other social arts.
2. Students will be able to understand about the Indian literature.
3. Students will be able to understand about the Indian Freedom Struggle and contribution of revolutionaries in freedom struggle.
4. Students will be able to understand and understand about the Indian Constitution.
5. Students will be able to understand communication processes and personality development

UNIT – I

Indian Art meaning of art, features of Indian art, elementary knowledge of paintings, music, dancing, sculpture archeology, iconography & other social arts.

UNIT – II

Indian Literature, Ancient Indian Literature, Elementary knowledge of Vedic Literature, Mahabharat, Ramayan and other main granthas.

UNIT – III

Indian Freedom Struggle: Freedom Struggle of 1857, National Consciousness, non-cooperation movements. Civil disobedient movement quit India movement, contribution of revolutionaries in freedom struggle.

UNIT – IV

Indian Constitution: Introduction, main features of constitution, fundamental rights. parliamentary Government: Meaning, Features, rajya Sabha, Lok Sabha.

Unit V

Communication: Process, Channels, Barriers.

Listening: Types, Purpose, Barriers, Effective Listening Strategies.

Job Interviews Resume Writing, Group Discussion, Job Application Writing, Interview Preparation.

BOOK RECOMMENDED:

- Indian Culture the book sponsored by M. P. Hindi granth Academy.
- Parliamentary Procedure in India by A. R. Mukherjea
- Effective Technical Communication by M Ashraf Riz

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GOVT. V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)
SYLLABUS FOR: (2022-23)
BCA – PART II
Course Code: BCA-207
Practical LAB IV: Programming Lab in 'C++'

Course Objective:
The objectives of the course are to have students identify and practice the object-oriented programming concepts and techniques, practice the use of C++ classes and class libraries, arrays, vectors, inheritance and file I/O stream concepts.

Course Outcomes:
1. Understand key features of the object-oriented programming language such as encapsulation (abstraction), inheritance, and polymorphism.
2. Design and implement object-oriented applications.
3. Analyze problems and implement simple C++ applications using an object-oriented software engineering approach.

1. Scheme of Examination :-

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

Program 1	-	20
Program 2	-	20
Program 3	-	20
Viva	-	25
[Practical Copy + Internal Record]	-	15
Total	-	100

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

List of Practical

LOOPS, DECISIONS, NESTED METHOD, MEMBER FUNCTION DEFINED OUTSIDE CLASS BODY:

1. Write program to generate following pattern

a)
```
A B C D E F G
A B C   E F G
A B       F G
A           G
```

b)
```
1
1 2
1 2 3
1 2 3 4
```

c)
```
    *
  * *
* * *
```

d)
```
      1
    1 2 1
  1 3 3 1
1 4 6 4 1
```

2. Write member functions which when called asks pattern type; if user enters 11 then a member function is called which generates first pattern using for loop. If user enters 12 then a member function is called which generates first pattern using while loop. If user enters 13 then a member function is called which generates first pattern using do-while loop. If user enters 21 then a member function is called which generates second pattern using for loop and so on.

3. Write program to display number 1 to 10 in octal, decimal and hexadecimal system.

4. 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 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 earlier.

Array

5. Write a program using function to add, subtract and multiply two matrices of order 3×3, You have to create one function for addition, which accepts three array arguments. First two array arguments are matrices to add and third matrix is destination where the resultant of addition of first two matrix's is stored. In similar way create functions for matrix subtraction and multiplication.

6. Create a single program to perform following tasks without using library functions :

a) To reverse the string accepted as argument.

b) To count the number of characters in string passed as argument in form of character array.

c) To copy the one string to other string; passed as arguments in form of source character array and destination character array without using library function.

d) To count no. of vowels, consonants in each word of a sentence passed as argument in form of character array.

Class, Object, Array of object, Object Using Array

7. Create a class Student having data members to store roll number, name of student, name of three subjects, max marks, min marks, obtained marks. Declare an object of class student, Provide facilities to input data in data members and display result of student.

8. Create a class Student having data members to store roll number, name of student, name of three subjects, max marks, min marks, obtained marks. Declare array of object to hold data of 3 students. Provide facilities to display result of all students. Provide also facility to display result of specific student whose roll number is given.

9. Create a class Sarray having an array of integers having 5 elements as data member provide following facilities :

a) Constructor to get number in array elements
b) Sort the elements
c) Find largest element
d) Search for presence of particular value in array element.

Static member function

10. Create a class Simple with static member functions for following tasks:

a) To find factorial by recursive member function.
b) To check whether a no. is prime or not.
c) To generate Fibonacci series up to requested terms.

Object as argument to function, function returning object

11. Write program-using class having class name Darray. Darray has pointer to Pointer to integer as data member to implement double dimension dynamic array and provide following facilities :

a) Constructor to input values in array elements.
b) Input member function to get input in array element
c) Output member function to print element value
d) Add member function to perform matrix addition using objects.
e) Subtract member function to perform matrix subtraction using objects
f) Multiply member function to perform matrix multiplication using objects

12. Write program to create class complex having data members to store real and imaginary part Provide following facilities :

a) Add to complex no,using object. b) Subtract two complexes no,using object.
b) Multiply two complexes no, using objects d) Divide two complex no. using objects.

Friend Function

13. Create class polar having data member radius and angle. It contains member function for taking input in data members and member function for displaying value of data members. Class polar contains declaration of friend function add which accept two object of class polar and

returns object of class polar after addition.Test the class using main function and objects of class polar.

14. Write program to create class having data member a feet and inch (A single object will store distance in form such as 5 feet 3 inch). It contains member functions for taking input in data members and member function for displaying value of data members. Class Distance contains declaration of friend function add which accept two object of class Distance and return object of class Distance after addition. Class Distance contains declaration of another friend function.Subtract that accept two object of class Distance and returns object of class Distance after subtraction. Test the class using main function and object of class distance.

15. Write a program to create class Mother having data member to store salary of Mother, create another class Father having data member to store salary of Father.Write a friend function, which accept objects of class Mother, and Father and paints Sum of Salary of Mother and Father object.

Friend Class

16. Write a program to create class Mother having data member to store salary of Mother, create another class Father having data member to store salary of Father.Declare class Father to be friend class of Mother Write a member function in Father, which accept object of class Mother and prints. Sum of Salary of Mother and Father Object. Create member function in each class to get input in data member and to display the value of data member.

Static Data Member

17. Create a class Counter having a static data member, which keeps track of no. of objects created of type Counter. ONE static member function must be created to increase value of static data member a s the object is created. One static member function must be created to decrease value of static data member as the object is destroyed. One static member function must be created to display the current value of static data member. Use main function to test the class Counter.

STRUCTURE AND CLASS

18. Define structure student. Structure has data members for storing name,rollno, name of three subjects and marks. Write member function to store and print data.

COPY CONSTRUCTOR,CONSTRUCTOR OVERLODING, THIS POINTER, CONSTRUCTOR WITH DEFAULT ARGUMENT.

19. Write program to create a class polar which has data member radius and angle, define overloaded constructor to initialize object and copy constructor to initialize one object by another existing object keep name of parameter of parameterized constructor same as data members. Test function of the program in main function.

20. Write program to create a class polar which has data member radius and angle,use constructor which default arguments to avoid constructor overloading and copy constructor to

initialize one object by another existing object keep name of parameter of parameterized constructor same as data members. Test functioning of the program in main function.

FUNCTION OVERLODED, REFERENCE VARIABLE, PARAMETER PASSING BY ADDRESS, STATIC FUNCTION

21. Write a class having name Calculate that uses static overloaded function to calculate area of circle, area of rectangle and area of triangle.

22. Write a class array. Sort that uses static overloaded function to sort an array of floats, an array of integers.

23. Write a program using class, which uses static overloaded function to swap two integers, two floats methods use reference variable.

24. Write a program using class, which use static overloaded function swap two integers, two floats methods use parameter passing by address.

STRING,POINTER, AND OPERATOR OVERLODING

25. Create class String having pointer to character as data member and Provide following Facilities :

a) Constructor for initialization and memory allocation.
b) Destructor for memory release.
c) Overloaded operators + to add two string object
d) Overloaded operators = to assign one string object to other string object.
e) Overloaded operators == to compare whether the two string objects are equal or not
f) Overloaded operator < to compare whether first-string object is less than second-string object.
g) Overloaded operator > to compare whether first-string object is greater than second-string object or not.
h) Overloaded operator <= to compare whether first string object is less than or equal to second string object or not
i) Overloaded operator >= to compare whether first string object is greater than or equal to second string object
j) Overloaded operator != to compare whether first string object is not equal to second string object or not.
k) Overloaded insertion and extraction operators for input in data member and display out put of data members.

26. Create a class Matrix having data member double dimension array of floats of size 3×3. Provide following facilities :

a) Overloaded extraction operator for data input.
b) Overloaded insertion operator for data output.
c) Overloaded operator + for adding two matrix using objects.
d) Overloaded operator – for subtracting two using matrix objects.
e) Overloaded operator * for multiplying two using matrix objects.

OPERTOR OVERLODADING WITH FRIEND FUNCTION

27. Create a class Polar having radius and angel as data members.
Provide following facilities;

a) Overloaded insertion and extraction operators for data input and display.
b) Overloaded constructor for initialization of data members.
c) Overloaded operator + to add two polar co-ordinates using objects of class Polar .

28. Create class Degree-Celsius having a single data member to hold value of temperature in degree Celsius. Provide following facilities :

a) Overloaded operator ++ which will increase value of data member by 1 (consider post fix and prefix operator overloading).
b) Overloaded operator – – which will decrease value of data member by 1 (consider post fix and prefix operator overloading).
c) Overloaded insertion and extraction operators for input in data member and display value of data member.
d)

OPERATOR OVERLOADING AND DATA TYPE CONVERSION

29. Create a class Polar that contains data member radius and angle.
Create another class Cartesian in the same program and provide followi9ng facilities :

a) It should be possible to assign object of polar class to object of Cratesian class.
b) It should be possible to assign object of Cartesian class to object of polar class.

30. Create a class Fahrenheit that contains a data member to hold temperature in Fahrenheit. Create another class Celsius that contains a data member to hold temperature in Degree Celsius; in the same program and provide following facilities :

a) It should be possible to assign object of Fahrenheit class to object of Celsius class.
b) It should be possible to assign object of Celsius class to object of Fahrenheit class.
c) It should be possible to compare objects of class Fahrenheit and Celsius to find out which object contains higher temperature.

VOID POINTER, POINTER AND POINTER TO OBJECT

31. 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.

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

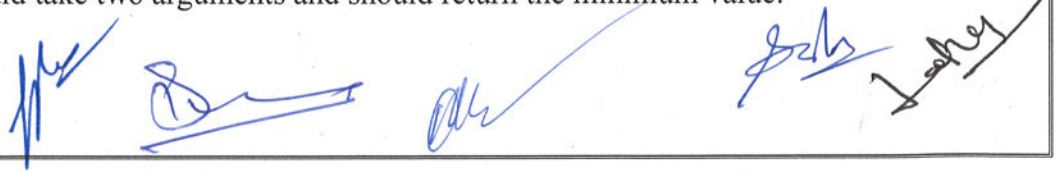
33. Write swapping program to demonstrate call by value, call by address and call by reference in a single program.

34. Write program to Create a class Employee having data members to store name of employee, employee id, salary. Provide member function for data input, output. Use Pointer to object to simulate array of object to store information of 3 employees and test the program in function main.

INLINE FUNCTION

35. Write a program using inline function to calculate area of circle

36. Write a program using inline function to find minimum of two functions. The inline function should take two arguments and should return the minimum value.



INHERITANCE

37. Create a class account that stores customer name,account number and type of account .From this derive the classes cur acct and say acct to make them more specific to their requirements. Include necessary member functions in order to achieve the following tasks.
    a) Accept deposit from customer.
    b) Display the balance
    c) Computer and deposit interest.
    d) permit withdrawal and update the balance.
    e) Check for the minimum balance,impose penalty, necessary and update the balance.
38. Create a class circle with data member radius, provide member function to Calculate area. Derive a class sphere from class circle.,proved member function to calculate volume. Derive class cylinder from class sphere with additional data member for height and member function to calculate volume.

39. Consider an esapal of declaring the examination result. Design three classes- student, exam and result. The student class has data member such as that representing roll number, name of student. Create the class exam. Which contains data members representing name of subject, minimum marks,maximum marks, obtained marks for three subjects.Drive class result from both student and exam. Class. Test the result class in main function.

VIRTUAL AND PURE VIRTUAL FUNCTION

40.Create a base class shape having two data members with two- member function getdata (pure virtual function) and print area (not pure virtual function) Derive classes triangle and rectangle from class shape and redefine member function print area in both classes triangle and rectangle and test the functioning of classes using pointer to base class objects and normal objects.

Name and Signatures

V.C. Nominee	**Departmental members**
Subject Expert ..... (D.P.Rao)	**1. HOD - Mr. Durgesh Kumar Kotangle**.....
Subject Expert.....	**2. Mr. Dileep Kumar Sahu** .....
Alumni(member).....	**3. Mrs. Latika Tamrakar**.....
Prof. from other Dept. of Sc. Faculty	
Specialist from Industry	

GOVT. V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)
SYLLABUS FOR: (2022-23)
BCA – PART II
Course Code: BCA-208
Practical LAB V: Database Management System Lab

Course Objective:
1. To explain basic database concepts, applications, data models, schema and instances.
2. To demonstrate the use of constraints and relational algebra operations. IV. Describe the basics of SQL and construct queries using SQL.
3. To emphasize the importance of normalization in databases.
4. To facilitate students in Database design
5. To familiarize issues of concurrency control and transaction management.

Course Outcomes:
1. Demonstrate an understanding of the relational data model.
2. Transform an information model into a relational database schema and to use a data definition language and/or utilities to implement the schema using a DBMS.
3. Formulate, using relational algebra, solutions to a broad range of query problems.
4. Formulate, using SQL, solutions to a broad range of query and data update problems.

1. **Scheme of Examination:-**

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

Program 1 (Oracle)	**-20**	
Program 2 (Oracle)	**-20**	
Program 3 (Oracle)	**-20**	
Viva		**-25**
(Practical Copy +		**-15**
Practical Sessional)		
Total		**-100**

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

1. Using the following database,

   Colleges (ename, city, address, phone, afdate)
   Staffs (sid, sname, saddres, contacts)
   Staffjoines (sid, cname, dept, DOJ, post salary0
   Techings (sid, class, paperid, fsession, tsession)
   Subject (paperid subject paperno, papername)

   Write SQL statements for the following –

   a) Create the above tables with the given specifications and constraints.

b) Insert about 10 rows as are appropriate to solve the following queries.
c) List the name of the teachers teaching computer subjects.
d) List the name and cities of all staff working in your college.
e) List the names and cities of all staff working in your college who earn more than 15,000
f) Find the staffs whose names start with 'M' or 'R' and ends with 'A' and /or 7 characters long
g) Find the staffs whose date of joining is 2005.
h) Modify the database so that staff N1 now works in C2 College
i) List the names of subjects, which T1 teaches in this session or all sessions.
j) Find the classes that T1 do not teach at present session.

a. Find the colleges who have most number of staffs.
b. Find the staffs that earn a higher salary who earn greater than average salary of their college.
c. Find the colleges whose average salary is more than average salary of C2
d. Find the college that has the smallest payroll.
e. Find the colleges where the total salary is greater than the average salary of all colleges
f. List maximum average, minimum salary of each college.

a. List the names of the teachers, departments teaching in more than one department
b. Acquire details of staffs by name in a college of each college.
c. Find the names of staff that earn more than each staff of C2 College.
d. Give all principals a 10% rise in salary unless their salary become greater than 20,000 in such case give 5% rise.
e. Find all staff that do not work in same cities as the colleges they work.
f. List names of employees in ascending order according to salary who are working in your college or all colleges.

a. Create a view having fields sname, cname, dept, DOJ, and post
b. Create a view consisting of cname, average salary and total salary of all staff in that college.
c. Select the colleges having highest and lowest average salary using above views.

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)
Fee Structure (course, yearsem, fee)
Payment (billno, admno, amount, pdate, purpose)

a) Create the above tables with the given specifications and constraints.
b) Insert about 10 rows as are appropriate to solve the following queries.

c) Get full detail of all students who took admission this year class wise
d) Get detail of students who took admission in Bhilai colleges.
e) Calculate the total amount of fees collected in this session
   i) By your college ii) by each college iii) by all colleges
   a) List the students who have not payed full fee
      i) in your college ii) in all colleges
   b) List the number of admission in your class in every year.
   c) List the students in the session who are not in the colleges in the same city as they live in.
   d) 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)

   a. Create the above tables with the given specifications and constraints.
   b. Insert about 10 rows as are appropriate to solve the following queries.
   c. List the students who were present in a paper of a subject.
   d. List all roll numbers who have passed in fi9rst division
   e. List all student in BCA-II who have scored higher than average
      i) in your college ii) in every college
   f. List the highest score, average and minimum score in BCA-II
      i) In your college ii) in every college

4. Using the following database

   Colleges (cname, city, address, phone, afdate)
   Staffs (sid, sname, saddress, contacts)
   Staff Joins (sid, cname, dept, DOJ, post salary)
   Teachings (sid, class, paperid, fsession, tsession)
   Subjects (paperid, subject, paperno, papername)

   Write SQL statements for the following –

   a. Create the above tables with the given specifications and constraints.
   b. Insert about 10 rows as are appropriate to solve the following queries.
   c. List the name of the teachers teaching computer subjects.
   d. List the names and cities of all staff working in your college.
   e. List the names and cities of all staff working in your college who earn more than 15,000
   f. Using the following database

      Colleges (cname, city, address, phone, afdate)

5. Using the following database

   Colleges (cname, city, address, phone, afdate)
   Staffs (sid, sname, saddress, contacts)

Staff Joins (sid, cname, dept, DOJ, post, salary)
Teachings (sid, class, paperid, fsession, tsession)
Subjects (paperid, subject, paperno, papername)

a. Find the staffs whose names start with 'M' or 'R' and ends with 'A' and/or 7 characters long.
b. Find the staffs whose date of joining is 2005.
c. Modify the database so that staff N1 now works in C2 college
d. List the names of subjects which T1 teaches in this session or all sessions.

6. Using the following database

Colleges (cname, city, address, phone, afdate)
Staff (sid, sname, saddress, contacts)
Staff Joins (sid, cname, dept, DOJ, post, salary)
Teachings (sid, class, paperid, fsession, tsession)
Subjects (paperid, subject, paperno, papername)

a. Find the classess that T1 do not teach at present session.
b. Find the college who have most number of staffs.
c. Find the staffs who earn a higher salary who earn greater than everage salary of their college.
d. Find the colleges whose average salary is more than average salary of C2
e. Find the college that has the smallest payroll.
f. Find the colleges where the total salary is greater than the average salary of all colleges.
g. List maximum, average, minimum salary of each college

7. Using the following database

Colleges (cname, city, address, phone, afdate)
Staffs (sid, sname, saddress, contacts)
Staff Joins (sid, cname, dept, DOJ, post, salary)
Teachings (sid, class, paperid, fsession, tsession)
Subjects (paperid, subject, paperno, papername)

a. Find the classes that T1 do not teach at present session.
b. List the names of the teachers, departments teaching in more than one departments.
c. Acquire details of staffs by name in a college or each college.
d. Find the names of staff who earn more than each staff of C2 college.
e. Give all principals a 10% rise in salary unless their salary becomes greater than 20,000 in such case give 5% rise.
f. Find all staff who do not work in same cities as the colleges they work.
g. List names of employees in ascending order according to salary who are working in your college or all colleges.

8. Using the following database

Colleges (cname, city, address, phone, afdate)
Staffs (sid, sname, saddress, contacts)

Staff Joins (sid, cname, dept, DOJ, post, salary)
Teachings (sid, class, paperid, fsession, tsession)
Subjects (paperid, subject, paperno, papername)

a. Find the classes that T1 do not teach at present session.

b. Create a view having fields sname, cname, dept, DOJ, and post

c. Create a view consisting of cname, average salary and total salary of all staff in that college.

d. Select the colleges having highest and lowest average salary using above views.

e. List the staff names of a department using above views.

9. Enrollment (enrollno, name, gender, DOB, address, phone)
Admission (admno, enrollno, course, yearsem, yearsem, data, cname)

a. Create the above tabls with the given specifications and constraints.

b. Insert about 10 rows as are appropriate to solve the following queries.

c. Get fullo detail of all students who took admission this year Classwise

d. Get detail of students who took admision in Bhilai colleges.

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

10. Enrollment (enrollno. Name, gender, DOB, address, phone)
Admission (admno, enrollno, course, yearsem, date, cname)
Colleges (cname, city, address, phone, afdate)
Fee Structure (course, yearsem, fee)
Payment (billno, admno, amount, pdate, purpose)

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

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

c. List the students in the session who are nt in the colleges in the same city as they live in.

d. List the student in colleges in your city and also live in your city.

11. Subjects (paperid, subject, paper, papername)
Test (paperid, date, time, max, min)
Score (rollno, paperid, marks, attendence)
Students (admno, rollno, class, yearsem)

a. Create the above tables with the given specifications and Constraints

b. Insert about 10 rows as are appropriate to solve the following queries.

c. List the students who were present in paper of a subject.

d. List all roll numbers who have passed in first division.

e. Lit all students in BCA-II who have scored higher than average
i) in your college ii) in every college

f. List the highest score, average and minimum score in BCA-II
i) in your college ii) in every college

Name and Signatures

V.C. Nominee	**Departmental members**
Subject Expert ..... (D.PRAO)	**1. HOD - Mr. Durgesh Kumar Kotangle**.....
Subject Expert.....	**2. Mr. Dileep Kumar Sahu** .....
Alumni(member).....	**3. Mrs. Latika Tamrakar**.....
Prof. from other Dept. of Sc. Faculty	
Specialist from Industry	

GOVT. V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)
SYLLABUS FOR: (2022-23)
BCA – PART II
Course Code: BCA-209-
Practical LAB VI: Operating System Lab

Course Objective:
The Operating System Laboratory, OS Lab is a course that will teach students about principles of operating systems using a constructivist approach and problem-oriented learning. Basics of UNIX Commands1…. Write programs using the I/O System calls of UNIX operating system (open, read, write, etc.).

Course Outcomes:
1. Students will be able to understand key features of the various Operating Systems.
2. Implement various commands of Linux Operating System.
3. Students will be able to understand the directory structure of Operating System.

1. **Scheme of Examination:-**

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

Program 1	**-20**
Program 2	**-20**
Program 3	**-20**
Viva	**-25**
(Practical Copy+ Practical Sessional)	**-15**
Total	**-100**

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 commandline
   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. 1^{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 1th 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

Name and Signatures

V.C. Nominee	**Departmental members**
Subject Expert ..... (C.D.P.Rao)	**4. HOD - Mr. Durgesh Kumar Kotangle**.....
Subject Expert.....	**5. Mr. Dileep Kumar Sahu** .....
Alumni(member).....	**6. Mrs. Latika Tamrakar**.....
Prof. from other Dept. of Sc. Faculty	
Specialist from Industry	

GOVT. V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG

DIRECTIVES FOR STUDENTS, FACULTY AND EXAMINERS

1. There shall be three sections (Section A, B, and C) in each theory paper.
2. Section A shall contain very short answer type questions (One or two line answer) or objective type questions (fill in the blank). **(not multiple choice questions)**
3. Section B shall contain short answer type questions with the limit of 150 words
4. Section C shall contain long answer/ descriptive type questions. The students are required to answer precisely and the answer should not exceed the limit of 350 words.
5. The students are required to study the content mentioned in the curriculum exhaustively.

EVALUATION PATTERN

- **Theory 80 marks**
- **Practical 100 marks**

Question Type	MM 80 (Marks X No. of Q.)
A (Very short Ans.)	1X10 = 10
B (Short Ans.)	4X5 = 20
C (Long Ans.)	10X5 = 50

Name and Signatures

V.C. Nominee	**Departmental members**
Subject Expert ..... (D.P Rao)	**1. HOD - Mr. Durgesh Kumar Kotangle**.....
Subject Expert.....	**2. Mr. Dileep Kumar Sahu** .....
Alumni(member).....	**3. Mrs. Latika Tamrakar**.....
Prof. from other Dept. of Sc. Faculty	
Specialist from Industry	

Corrigendum for UG Classes

1. **Section –A (very short answer question)**

There shall be very short answer type questions (No multiple choice). All questions are compulsory; at least one from each unit.

2. **Section B, Section C**

There shall be 10 questions, two questions from each unit.

The candidate has to attempt one question from each unit.

Name and Signatures

V.C. Nominee	**Departmental members**
Subject Expert	**1. HOD - Mr. Durgesh Kumar Kotangle**.....
Subject Expert.....	**2. Mr. Dileep Kumar Sahu** .....
Alumni(member).....	**3. Mrs. Latika Tamrakar**.....
Prof. from other Dept. of Sc. Faculty	
Specialist from Industry	

BCA-III

DEPARTMENT OF COMPUTER SCIENCE
GOVT. V.Y.T. PG. AUTONOMOUS COLLEGE DURG

Approved syllabus for BCA by the members of Board of Studies for the Session 2022-23

BCA PART-III:

PAPER I: (BCA- 301)	**Statistical Analysis**
PAPER II: (BCA- 302)	**Programming in Python**
PAPER III: (BCA- 303)	**Dot Net Technology**
PAPER IV: (BCA- 304)	**Software Engineering**
PAPER V: (BCA- 305)	**Data Structure**
PAPER VI: (BCA- 306)	**Computer System Architecture**
PRACTICAL VII: (BCA-307)	**LAB VII: Programming Lab in Python**
PRACTICAL VIII: (BCA- 308)	**LAB VIII: Dot Net Technology Lab**
PRACTICAL IX: (BCA- 309)	**LAB IX: PROJECT**

Name and Signatures

V.C. Nominee	**Departmental members**
Subject Expert ..... (D. P. Rao)	**1. HOD - Mr. Durgesh Kumar Kotangle.....**
Subject Expert.....	**2. Mr. Dileep Kumar Sahu .....**
Alumni(member).....	**3. Mrs. Latika Tamrakar.....**
Prof. from other Dept. of Sc. Faculty	
Specialist from Industry	

SCHEME OF EXAMINATION 2020-2021
BCA PART- III

Subject Code	Subject Paper	Theory Marks		Marks		Teaching Load per Week		
		Max. (A)	Min. (B)	Max. (C)	Min. (D)	L	T	P
BCA-301	Statistical Analysis	80	27	20	8	4	2	-
BCA-302	Programming in Python	80	27	20	8	4	2	-
BCA-303	Dot Net Technology	80	27	20	8	4	2	-
BCA-304	Software Engineering	80	27	20	8	4	2	-
BCA-305	Data Structure	80	27	20	8	4	2	-
BCA-306	Computer System Architecture	80	27	20	8	4	2	-
BCA-307	LAB VII: Programming Lab in Python	100	50	40	16	-	-	3x2
BCA-308	LAB VIII: Dot Net Technology Lab	100	50	40	16	-	-	2x2
BCA-309	LAB IX: Project	100	50	20	8	-	-	1x2
TOTAL		780	312	220	88			
GRAND TOTAL	(PAPER + INTERNAL)	(A+C) 1000		(B+D) 400				

NOTE: Student will have to pass individually in all theory, practical and sessional.

Name and Signatures

V.C. Nominee .....

Subject Expert ..... (D. P Rao)

Subject Expert.....

Alumni(member).....

Prof. from other Dept. of Sc. Faculty .....

Specialist from Industry .....

Departmental members

1. HOD-Mr. Durgesh Kumar Kotangle .....
2. Mr. Dileep Kumar Sahu .....
3. Mrs. Latika Tamrakar .....

GOVT. V.Y.T. P.G. AUTO. COLLEGE, DURG (C.G.)
SYLLABUS FOR: (2022-23)
BCA – PART III
SUBJECT CODE: BCA -301
STATISTICAL ANALYSIS

Max Marks: 80 **Min Marks: 27**

Note: The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. Only Simple calculators allowed not scientific calculator.

Course Objective: This course is designed to provide students with an understanding of the data and its relevance in business and develop an understanding of the quantitative techniques from statistics.

Course Outcome: Upon successful completion of this course, students will be able to:

- Organize, manage and present data.
- Analyze statistical data graphically using frequency distributions and cumulative frequency distributions.
- Apply the rules and algorithm of probability and statistics in various logical problems.
- Analyze statistical data using measures of central tendency, dispersion and location.
- Mathematical probabilistic models for different problems, to analyze them and to interrupt the results.

UNIT-I

COMBINATORICS: Permutation and Combination, Repetition and Constrained Repetition, Binomial Coefficients, Binomial Theorem.

UNIT-II

Frequency distributions, Histograms and frequency polygons, Measures of central tendency: Mean, Mode, Median, Dispersion, Mean deviation and standard deviation. Moments, Skewness, kurtosis.

UNIT—III

Elementary probability theory: Definition, conditional probability, Probability distribution, mathematical expectation.

Theoretical distribution: Binomial , Poisson and Normal distribution, Relation between the binomial, poisoned Normal distribution.

UNIT-IV

Correlation and Regression: Linear Correlation, Measure of Correlation, Least Square Regressionlines.

Curve fitting: Method of least square, least square line, least squares Parabola. Chi-square test: definition of chi-square; signification test: contingency test, coefficient of contingency.

UNIT-V

UNIT-V

Basic of sampling theory: Sample mean and variance, students t-test, test of Hypotheses and significance, degree of freedom, Z-test, small and large sampling, Introduction to Monte Carlo method.

TEXT BOOKS:

I. Advanced Engineering Mathematics: H.K. Doss; S. Chand & Co., 9 Revised Edition, 2001.

2. Discrete Mathematics: S.K. Sarkar; S. Chand & Co., 2000.

3. Numerical Analysis: S.S. Sastry; Prentice Hall of India, 1998.

4. Mathematical Statistics: J.N. Kapoor and H.C. Saxena.

5. Mathematical Statistics: M. Ray and H. Sharma

Name and Signatures

V.C. Nominee	**Departmental members**
Subject Expert ..... (D'PRAO)	**1. HOD-Mr. Durgesh Kumar Kotangle** .....
Subject Expert.....	**2. Mr. Dileep Kumar Sahu** .....
Alumni(member).....	**3. Mrs. LatikaTamrakar** .....
Prof. from other Dept. of Sc. Faculty	
Specialist from Industry	

GOVT. V.Y.T. P.G. AUTO. COLLEGE, DURG (C.G.)
SYLLABUS FOR: (2022-23)
BCA – PART III
SUBJECT CODE: BCA -302
PROGRAMMING IN PYTHON

Max Marks: 80 **Min Marks: 27**

Note: The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. Only Simple calculators allowed not scientific calculator.

Course Objective: Covers software design, implementation, and testing using Python Introduces object-oriented design techniques and problem solving. Emphasizes on Data handling and Data Visualization using Python Libraries.

Course Outcome: At the end of this course, Student will able to:

- Define the Structure and Components of a Python Program.
- Interpret the fundamental Python syntax and semantics and be fluent in the use of Python control flow statements
- Interpret the concepts of Object-Oriented Programming as used in Python
- Discover the commonly used libraries for data handling
- Demonstrate data handling concepts and provide data visualization using Python matplotlib.

UNIT - I

Introduction to Python Programming Language, IDLE, Installing Python, basic syntax, interactive shell and script mode, editing saving and running a script; Variables, keywords ,mutable and immutable data types, Operators in Python, and expressions; input and output statements, comments in the program, understanding error messages.

UNIT-II

Lists, Tuples and Dictionaries and Control statements

Control Statements (Branching: if-else, Nested if-else, Looping, Conditional Statement, Exit function, Difference between break, continue and pass). Lists, Tuples Dictionaries and String Operation.

UNIT - III

Introducing Classes and Objects: Class Fundamentals, Declaring Object, Constructors, Defining Methods, method overloading, Inheritance: Inheritance basic and types, Member accessibility modifier: public, protected, private.

Python Exceptions Handling: Exception Basics, Handling an exception, try….except…else, try-finally clause

UNIT—IV

Data Handling using The Numerical Python Library (NumPy) and File Operations

Python packages, Introduction to PIP, Installing Packages via PIP, Introduction to NumPy library, NumPy arrays and their advantage, NumPy Attributes and Mathemetical,Binary and String Functions, creation of NumPy arrays; from lists using np.array(), np.zeros(), np.ones(),np.arange() , basic slicing and indexing ; concatenating and splitting array; Arithmetic operations on one dimensional and two dimensional arrays. Calculating max, min, count, sum, mean, median, mode, standard deviation on NumPy arrays.

Python File Operations: Reading files, Writing files in python, Understanding read functions, read(), readline(), readlines(). Understanding write functions, write() and writelines()

UNIT-V

Data Handling using Pandas and Data Visualization using Matplotlib

Data Handling using Pandas - Introduction to Python libraries- Pandas, Matplotlib.
Data structures in Pandas - Overview of Series and Data Frames,
Reading data from csv file Importing/Exporting Data between CSV files and Data Frames.
Data Visualization Matplotlib- Purpose of plotting, drawing and saving of different basic Matplotlib charts (line plot, bar graph, histogram). Basic customization of plots: adding label, title, and legend in plots.

BOOKS RECOMMENDED:

1. PYTHON COMPLETE REFERENCE - BY ATRICKNAUGHTEN&MESUTSCPDDT. [TMH]
2. Python Programming Anurag Gupta, G P Biswas Mc Graw Hill
3. Complete Reference Python Martin C. Brown Mc Graw
4. Python for beginners Harsh Bhasin

Name and Signatures

V.C. Nominee	**Departmental members**
Subject Expert ..... (D.P Rao)	**1. HOD-Mr. Durgesh Kumar Kotangle**
Subject Expert.....	.....
Alumni(member).....	**2. Mr. Dileep Kumar Sahu** .....
Prof. from other Dept. of Sc. Faculty.....	**3. Mrs. Latika Tamrakar** .....
Specialist from Industry	

GOVT. V.Y.T. P.G. AUTO. COLLEGE, DURG (C.G.)

SYLLABUS FOR: (2022-23)
BCA – PART III
SUBJECT CODE: BCA -303
DOT NET TECHNOLOGY

Max Marks: 80 **Min Marks : 27**

Note: The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. Only Simple calculators allowed not scientific calculator.

Course Objective:

- **Understand** code solutions and compile VB.Net projects within the .NET framework.
- **Design** and **develop** professional console and window based .NET application
- **Demonstrate** knowledge of object-oriented concepts Design user experience and functional requirementsVB.NET application.
- **Construct** classes, methods, and assessors, and instantiate objects.

Course Outcome: At the end of this course, Student will able to:

- **Create** and **manipulate** GUI components in VB.
- **Design** and **Implement** Windows Applications using Windows Forms, Control Library, Advanced UI Programming & Data Binding concepts
- **Design** and **Implement** database connectivity using ADO.NET in window based application.
- **Identify** and resolve problems (debug /trouble shoot) in VB.NET window based application
- **Identify** Industry defined problem and suggesting solution(s) using .NET application.

UNIT-I Inside the .Net Framework

Overview of .Net framework, Features of .Net, CLR, Common Language Specification, !IT compilation, MSIL, Namespace, FCL, Assemblies, Common Type System, Cross Language, lnteroperability, Garbage Collection.

UNIT- II Programming with VB.Net

Data types, Variables, Constant, Type Conversions, Operators, Control Structure : Conditional Statement, loops(do loop, for loop, while loop, for Each...Next loop), arrays, Declaring arrays and dynamic arrays, Types, Structure, Enumeration, Sub Procedure, Functions.

Unit- III Windows Form:

Windows Form: Working with visual Studio IDE, Creating a .Net Solution, simple forms, MDI forms, windows forms: Control class, TextBox, Richtextboxes, Labels, Button, Checkbox, Radio Button, Panels, Group box, Listbox , Checked list box, Combobox , Picture box, Scrollbar, Timer, Trackbar, Progress bar. Msgbox Function, Message Box. Show Method, Input Box function, Creating MDI application. Menus, creating Menu, sub menu Items, Context Menu.

Unit- IV OOPS concept

Class and objects, creating classes, objects, creating data member, creating class shared data member, shared methods, shared properties, overloading methods and properties, with statement, constructor, Destructor(using finalize method), Inheritance, overriding base class member, inheriting constructor, overloading base class member.

Unit- V Database Programming

Database concept, Ado.net Architecture, .Net Data Provider(Connection class: OledbConnection,SqIConnection, Command class : SqICommand class, OleDbCommand class, DataAdapter class, DataReader class), Dataset Component, Creating Database application using windows forms(DB connectivity through ADO.Net), accessing data from database, navigate in data, working with Data Grid.

BOOKS RECOMENDED:

- MSDN online — By Microsoft.
- Visual Basic .NET Complete — BPB Publications, New Delhi.
- The Complete Reference VB. NET — Jeffery R. Shapiro, Tata McGraw Hill.
- Visual Basic .NET Programming Black Book — Steven Holzner by Dreamtech Press.

Name and Signatures

V.C. Nominee	**Departmental members**
Subject Expert ..... (C.D.PRao)	**1. HOD-Mr. Durgesh Kumar Kotangle**
Subject Expert.....	**.....**
Alumni(member).....	**2. Mr. Dileep Kumar Sahu .....**
Prof. from other Dept. of Sc. Faculty	**3. Mrs. Latika Tamrakar .....**
Specialist from Industry	

GOVT. V.Y.T. P.G. AUTO. COLLEGE, DURG (C.G.)
SYLLABUS FOR: (2022-23)
BCA – PART III
SUBJECT CODE: BCA -304
SOFTWARE ENGINEERING

Max Marks: 80 **Min Marks: 27**

Note: The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. Only Simple calculators allowed not scientific calculator.

Course Objective:

- Be employed in industry, government, or entrepreneurial endeavors to demonstrate professional advancement through significant technical achievements and expanded leadership responsibility;
- Demonstrate the ability to work effectively as a team member and/or leader in an ever-changing professional environment; and
- Progress through advanced degree or certificate programs in computing, science, engineering, business, and other professionally related fields.

Course Outcome: Attheendof this course,Studentwillableto:

- Identify, formulate, and solve complex engineering problems by applying principles of engineering, science, and mathematics
- Understand the various process models.
- An ability to communicate effectively with a range of audiences.
- Be able to design software by applying the software engineering principles.
- Understand the concept of software requirement specification.

UNIT — I

Software Engineering Fundamentals: Definition of software product; software development paradigms; software engineering; knowledge engineering and end user development approaches. Software Analysis:
Abstraction; partitioning and projection; system specification; software requirements specification (SRS) standards; formal specification method; specification tools; flow based, data based and object orientated analysis.

UNIT - II

Systems Design: Idealised and constrained design; process oriented design (cane and Sarsonand Yourdon notations); data oriented design (Wamier — (Orr, E-r modeling); Object oriented design (Booth approach); Cohesion and coupling; Design metrics; design documentation standards.

UNIT - III

Role of Case Tools: Relevance of case tools; High-end and low—end case tools; Automatedsupport for data dictionaries, data flow diagrams, entity relationship diagrams. Coding **And Programming:** Choice of programming languages; mixed language programming and call semantics; Re-engineering legacy systems; coding standard.

UNIT - IV

Software Quality And Testing: Software quality assurance; types of software testing (white box, black box, unit, integration, validation, system etc); debugging and reliability analysis; program complexity analysis; software quality and metrics; software maturity model and extensions. Software cost and Time estimation. Functions points; issues in software cost estimation; introduction to the Rayleigh curve3; alglorithmic cost model (COCOMO, Putnam-slim, Watson and feliix).

UNIT - V

Software Project Management: Planning software projects; work background structures; integrating software, software design and project planning; software project teams; project monitoring and controls.

RECOMENDED BOOKS:

I. Software Engineering: A Practitioner's Approach — by Essman Roger, Tata McGraw Hill

2. An Integrated approach to Software Engineering — by JalotePankaj, Narosa: New Delhi.

Name and Signatures

V.C. Nominee	**Departmental members**
Subject Expert ..... (D.P Rao)	**1. HOD-Mr. Durgesh Kumar Kotangle** .....
Subject Expert.....	**2. Mr. Dileep Kumar Sahu** .....
Alumni(member).....	**3. Mrs. LatikaTamrakar** .....
Prof. from other Dept. of Sc. Faculty	
Specialist from Industry	

GOVT. V.Y.T. P.G. AUTO. COLLEGE, DURG (C.G.)
SYLLABUS FOR: (2022-23)

BCA – PART III

SUBJECT CODE: BCA -305

DATA STRUCTURE

Max Marks: 80 **Min Marks: 27**

Note: The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. Only Simple calculators allowed not scientific calculator.

Course Objective:-

- Analyze the asymptotic performance of algorithms.
- Write rigorous correctness proofs for algorithms.
- Demonstrate a familiarity with major algorithms and data structures.
- Apply important algorithmic design paradigms and methods of analysis.
- Synthesize efficient algorithms in common engineering design situations.

Course Outcome: At the end of this course, Student will able to:

- Make appropriate data structure and algorithm design decisions with respect to program size, execution speed and storage efficiency.
- Know common data structures(such as array, static array, dynamic array, pointers)
- Know common data structures (such as linked list, stacks, queues, priority queues, associative containers.
- Calculate the complexities of algorithms' of tree.
- Write an implement various sorting, searching and hashing problems.

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

UNIT — IICONCEPT OF ARRAYS, RECORDS AND POINTERS —
Basic Terminology, Linear Array; Single Dimensional Array, Multidimensional Array, Static Array, Dynamic Array; **Pointers:** Introduction of Pointer, **Records:** Record Structures.

UNIT — IIILINKED 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.

UNIT—IVTREES -
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

UNIT – VSORTING AND SEARCHING —
Sorting: Bubble Sort, Quick Sort, Insertion Sort, Selection Sort, Merge Sort; **Searching:** Liner Search, Binary Search, Searching and data modification, Introduction to hashing.

BOOKS RECOMMENDED:

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

GOVT. V.Y.T. P.G. AUTO. COLLEGE, DURG (C.G.)
SYLLABUS FOR: (2022-23)
BCA – PART III
SUBJECT CODE: BCA -306
COMPUTER SYSTEM ARCHITECTURE

Max Marks: 80 **Min Marks: 27**

Note: The Question Paper setter is advised to prepare unit-wise question with the provision of internal choice. Only Simple calculators allowed not scientific calculator.

Course Objective:

- To understand the structure, function and characteristics of computer systems.
- To understand the design of the various functional units and components of computers.
- To identify the elements of modern instructions sets and their impact on processor design.

Course Outcome: At the end of this course, Student will able to:

- Describe the fundamental organization of a computer system and number systems.
- Explain the Boolean algebra with simplification methods and various types of logic circuits.
- Explain fundamental functions of CPU Organization.
- Describe basic concept of Input-output organization.
- Distinguish the organization of various parts of a system memory hierarchy and memory management system.

UNIT I

Data Representation — Data Types, Number System, Fixed Point Representation — I 's, 2's complements, Binary Fixed point representation, Arithmetic operation on Binary operation, Overflow & Underflow, Codes, ASCII, EBCDIC codes, Grey codes, Excess-3, BCD codes, Error detection & correcting codes.

UNIT II

Digital Logic Circuits — Logic Gates AND, OR, NOT, Gates & their truth tables, NOR, NAND & XOR Gates, Boolean algebra, Basic Boolean Law, Demorgan's theorem, Map Simplification, Minimizing technique, K Map, Sum of products, Product of sums, Combinational & sequential Circuits Half adder & Full adder, Full Subtractor, Flip Flop — RS, D, JK & T Flip Flop, Shift register, RAM & ROM.

UNIT III

CPU organization, ALU & control circuit, Idea about arithmetic circuits, Program control, Instruction sequencing, Introduction to Microprocessor, System buses, Registers, Program counter, Block diagram of a Macro computer system, Microprocessor control signals, Interfacing Devices, Introduction to Motherboard, SMPS.

UNIT IV

Input output organization, I/O Interface, Properties of simple I/O devices and their Controller, Isolated versus Memory mapped I/O, Modes of Data transfer, Synchronous & Asynchronous Data Transfer, Handshaking, Asynchronous serial transfer, I/O processor.**UNIT V**

Auxiliary memory - Magnetic drum, Disk & Tape, Semi conductor memories, Memory Hierarchy, Associative memory, Virtual memory, address space & memory space, Address mapping, Page table, Page replacement, cache memory, Hit ratio, Mapping Techniques, Writing into cache.

BOOKS RECOMMENDED :

1. Computer System architecture— M. Moris Mano
2. Computer Architecture and Organization — Nicholas P Carter, Schaum's Outlines
3. Computer Organization and Architecture — William Stallings

GOVT. V.Y.T. P.G. AUTO. COLLEGE, DURG (C.G.)
SYLLABUS FOR: (2022-23)
BCA – PART III
SUBJECT CODE: BCA -307
LAB VII: PROGRAMMING LAB IN PYTHON

Course Objective: This course intends to provide in-depth programming knowledge of programming with Python and project development.

Course Outcome: **On successful completion of the course, the student will be able to:**
CO1: Know basics of f python to write Programs.
CO2: Write program to handle String and List.
CO3: Implement program related to tuples and dictionary.
CO4: Design program related to objects and classes.
CO5: Design good data handling program in Pandas.

1. **Scheme of Examination:-**Practical examination will be of 3 hours duration. The distribution of practical marks will be as follows:

Programme 1	-	**20**
Programme 2	-	**20**
Programme 3	-	**20**
Viva	-	**20**
[Practical Copy + Internal Record]	-	**20**
Total		**– 100**

2. In every program there should be comment for each coded line or block of code
3. Practical file should contain printed programs 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

1. Python basic, Data types, Typecasting, Data type conversions, String operations, Slicing, Stride, String Methods. Python programming fundamentals-conditions & Branching
1. Input a welcome message and display it.
2. Input two numbers and display the larger / smaller number.
3. Input three numbers and display the largest / smallest number.
4. Determine whether a number is a perfect number, an Armstrong number or a palindrome.
5. Input a number and check if the number is a prime or composite number.
6. Count and display the number of vowels, consonants, uppercase, lowercase characters in string.
7. Input a string and determine whether it is a palindrome or not; convert the case of characters in a string.

2. Tuple, Lists, Set, Dictionaries- Tuple indexing, Slicing, Nesting, List indexing, List functions-extend, append, delete, split. List Aliasing, List Clone. Set –creating set, Set Operations. Dictionaries.
1. Find the largest/smallest number in a list/tuple

2. Input a list of numbers and swap elements at the even location with the elements at the odd location.
3. Input a list/tuple of elements, search for a given element in the list/tuple.
4. Input a list of numbers and test if a number is equal to the sum of the cubes of its digits. Find the smallest and largest such number from the given list of numbers.
5. Create a dictionary with the roll number, name and marks of n students in a class and display the names of students who have marks above 75.
6. To print the highest and lowest values in the dictionary

3. Objects and classes, working with Data in Python-Reading files, writing files, Copying file.

1. Read a text file line by line and display each word separated by #. Read a text file and display the number of vowels/ consonants/ uppercase/ lowercase characters in the file.
2. Create a binary file with name and roll number. Search for a given roll number and display the name, if not found display appropriate message.
3. Create a binary file with roll number, name and marks. Input a roll number and update the marks.
4. Remove all the lines that contain the character `a' in a file and write it to another file.

4 Data Handling with Pandas

1. Create a panda's series from a dictionary of values and array
2. Given a Series, print all the elements that are above the 75th percentile.
3. Create Data Frame quarterly sales where each row contains the item category, item name, and expenditure. Group the rows by the category and print the total expenditure per category.
4. Create a data frame for examination result and display row labels, column labels data types of each column and the dimensions
5. Filter out rows based on different criteria such as duplicate rows. 6. Importing and exporting data between pandas and CSV file.

Note: List of experiments may be changed by the concerned teacher.

Name and Signatures

V.C. Nominee	**Departmental members**
Subject Expert ..... (D.P Rao)	1. **HOD-Mr. Durgesh Kumar Kotangle** .....
Subject Expert.....	2. **Mr. Dileep Kumar Sahu** .....
Alumni(member).....	3. **Mrs. Latika Tamrakar** .....
Prof. from other Dept. of Sc. Faculty.....	
Specialist from Industry	

GOVT. V.Y.T. P.G. AUTO. COLLEGE, DURG (C.G.)
SYLLABUS FOR: (2022-23)
BCA – PART III
SUBJECT CODE: BCA -308
PRACTICAL LAB VIII: DOT NET TECHNOLOGY LAB

Course Objective

- **Understand** code solutions and compile VBprojects within the .NET framework.
- **Design** and **develop** professional console and window based .NET application
- **Demonstrate** knowledge of object-oriented concepts Design user experience and functional requirements C#.NET application.
- **Construct** classes, methods, and assessors, and instantiate objects.

Course Outcome

- **Create** and **manipulate** GUI components in C#.
- **Design** and **Implement** Windows Applications using Windows Forms, Control Library, Advanced UI Programming & Data Binding concepts
- **Design** and **Implement** database connectivity using ADO.NET in window based application.
- **Identify** and resolve problems (debug /trouble shoot) in C#.NET window based application
- **Identify** Industry defined problem and suggesting solution(s) using .NET application.

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1. Scheme of Examination:-Practical examination will be of 3 hours duration. The distribution of practical marks will be as follows:

Programme 1	-	**20**
Programme 2	-	**20**
Programme 3	-	**20**
Viva	-	**20**
[Practical Copy + Internal Record]	-	**20**
Total	–	**100**

List of Programs:

1. Write a program to find maximum between three numbers.
2. Write a program to check whether a number is negative, positive or zero.
3. Write a program to check whether a year is leap year or not.
4. Write a program to check whether a character is alphabet or not.
5. Write a program to find all roots of a quadratic equation
6. Design an application to input marks of five subjects Physics, Chemistry, Biology, Mathematics and Computer. Calculate percentage and grade according to following:
   Percentage >= 90% : Grade A
   Percentage >= 80% : Grade B
   Percentage >= 70% : Grade C
   Percentage >= 60% : Grade D
   Percentage >= 40% : Grade E
   Percentage < 40% : Grade F

7. Design an application to input basic salary of an employee and calculate its Gross salary according to following:

   Basic Salary <= 10000: HRA = 20%, DA = 80%
   Basic Salary a 20000: HRA = 25%, DA = 90%
   Basic Salary > 20000: HRA = 30%, DA = 95%

8. Design an application to input electricity unit charges and calculate total electricity bill according to the given condition:

   For first 50 units Rs. 0.50/unit
   For next 100 units Rs. 0.75/unit
   For next 100 units Rs. 1.20/unit
   For unit above 250 Rs. 1.50/unit
   An additional surcharge of 20% is added to the bill

9. Write a program to convert decimal to binary number system using bitwise operator.
10. Write a program to swap two numbers using bitwise operator
11. Write a program to create Simple Calculator using select case.
12. Write a program to find sum of all natural numbers between 1 to n .
13. Write a program to find first and last digit of any number 1
14. Write a program to enter any number and print its reverse.
15. Write a program to enter any number and check whether the number is palindrome or not.
16. Write a program to check whether a number is Armstrong number or not.
17. Write a program to print Fibonacci series up to n terms.
18. Write a program to print Pascal triangle upto n rows.
19. Write a program to print all negative elements in an array.
20. Design a digital clock using timer control.

21. Design an application that accepts the item name from the user and add it to a listbox and combobox.

22. Create an application that offers various food items to select from check boxes and a mode of payment using radio button. It then display the total amount payable.

23. Create an application to implement the working of Context menu on textbox.

24. WAP to illustrate all functionalities of listbox and combobox.

25. WAP using checknoxes for the following font effects.

   Bold
   Italic
   Underline
   Increase Font size
   Decrease Font size
   Font Color

26. WAP for temperature conversion using radiobutton
27. WAP to launch a rocket using Picturebox and Timer control.
28. WAP to change the back color of any control using scrollbox.
29. WAP to search an element for one dimensional array.
29. Design a menu such that it contain submenu such as Addition, Subtraction, Scalar Multiplication, Multiplication, Transpose of two metrics.

30. WAP to find greatest among three given number using user define procedures.
31. WAP to calculate factorial of a number using user define procedure.
32. WAP to check whether given number is neon or not using user define function.
33. WAP to check whether a given number is Niven or not using procedure.
34. WAP to check whether a given number is duck number or not.
35. WAP to check whether a given number is spy number or not.
36. WAP to check whether a given number.

37. Design the following application using radio button and checkbox: Design an application to Create

the Payroll form shown below. Number of hours must be entered as well as the appropriate rate.

Gross salary = rate " hours.
Net salary = gross salary - deductions.

38. Develop an application which is similar to notepad using menus.
39. Develop an application for facilitating purchasing order.

40. Develop an application for billing system in coffee shop

41. Develop an application which is similar to login form Define a Class 'ACCOUNT' include following Data members: Name of depositor, Account no, type of Account, balance amount. Member Functions: To Deposit an amount, to withdraw an amount after checking balance, to show balance. Also provide proper validations wherever necessary. Write a main program to test above class.

42. Develop a project which displays the student information in the relevant fields from the database which already exists.
43. Define structure student. Structure student has data members for storing name, rollno, name of three subjects and marks. Write member function to store and print data.

44. Write a class having name Calculate that uses static overloaded function to calculate area of circle, area of rectangle and area of triangle.

45. Create a class account that stores customer name, account number and type of account. From this derive the classes cur_acct and sav_acct to make them more specific to their requirements. Include necessary member functions in order to achieve the following tasks:
a) Accept deposit from customer.
b) Display the balance
c) Computer and deposit interest.
d) Permit withdrawal and update the balance.
e) Check for the minimum balance, impose penalty, necessary and update the balance.

48. Create a class circle with data member radius; provide member function to calculate area. Derive a class sphere from class circle; provide member function to calculate volume. Derive class cylinder from class sphere with additional data member for height and member function to calculate volume.

49. Consider an example of declaring the examination result. Design three classes:- student, exam and result. The student class has data members such as that representing roll number, name of student. Create the class exam, which contains data members representing name of subject, minimum marks, maximum marks, obtained marks for three subjects. Derive class result from both student and exam classes. Test the result class in main function.

50 WAP that implements the Concept of Encapsulation.
51. WAP to demonstrate concept of Polymorphism (function Overloading and constructor Overloading).

52. Create a class Student having data members to store roll number, name of student, name of three subjects, max marks, min marks, obtained marks. Declare an object of class student. Provide facilities to input data in data members and display result of student.

53. Create a class Student having data members to store roll number, name of student, name of three subjects, max marks, min marks, obtained marks. Declare array of object to hold data of 3 students. Provide facilities to display result of all students. Provide also facility to display result of specific student whose roll number is given.

54. Create a class array having an array of integers having 5 elements as data member provide following facilities:
    a) Constructor to get number in array elements.
    b) Sort the elements.
    c) Find largest element
    d) Search for presence of particular value in array element.

55. WAP to display records of a table using data dapter and code for buttons to move at first record, next record, previous record, last record in the table.

56. Create a table for employee and write a program using Dataset to add, delete, edit & navigate records.
57. WAP to access a database using ADO.net & display a key column in the combo box or list box when an item is selected in it, its corresponding records is shown in Datagrid control.

Name and Signatures

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Prof. from other Dept. of Sc. Faculty.....	
Specialist from Industry	

GOVT. V.Y.T. P.G. AUTO. COLLEGE, DURG (C.G.)
SYLLABUS FOR: (2022-23)
BCA – PART III
SUBJECT CODE: BCA -309
LAB IX: PROJECT

1. Scheme of Examination: The Project should be done by individual student. Practical Examination will be of 3 hours duration. The distribution of practical marks is as follows:

Software Demonstration -	40
Project Report (Hard Copy + Soft Copy) -	20
Project Demonstration/Presentation -	20
Project Viva -	20
Total - 100	

2. Format of the student project report on completion of the project:

- Cover page as per format
- Certificate of Approval
- Certificate of project guide/Center Manager
- Certificate of Evaluation
- Declaration / Self certificate
- Acknowledgement
- Synopsis of the project
- Main Report
  - Objective & Scope of the project
  - Theoretical Background of Project
  - Definition of problem
  - System Analysis & Design
  - System Planning (PERT Chart)
  - Methodology adopted, system Implementation & details of Hardware & Software used
  - System maintenance & Evaluation
  - Cost and Benefit Analysis
  - Detailed Life Cycle of the project
    - _ ERD, DFD
    - _ Input and Output Screen Design
    - _ Process involved
    - _ Methodology used for testing
    - _ Test Report, Printout of the code sheet
  - User/Operational Manual – including security aspect, access rights, backup control etc.
  - Conclusion
  - References
  - Soft copy of the project on CD

Formats of various certificates and formatting styles are as:

1. Project report Cover Format:

A

Project Report

On

Title of the Project report

(Times New Roman, Italic , Font Size=24)

Submitted in partial fulfillment of the requirements for the award of degree

Bachelor of Computer Application

From

GOVT. V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)

(Bookman Old Style, 16point, Center)

(Session -2022-23)

Guide
(Guide Name)

Submitted by:
(Student's Name)
Roll No.

Submitted to

Department of Computer Science
GOVT. V.Y.T. P.G. AUTONOMOUS COLLEGE, DURG (C.G.)
Affiliated to
Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

2. Certificate of Approval by Head of Department in letter head

CERTIFICATE OF APPROVAL

This is to certify that the Project work entitled "----------" is carried out Mr/Ms/Mrs ---------- ----------. A student of BCA-III year at **(College Name)** is hereby approved as a credible work in the discipline of Computer Science and Application for the award of degree of **Bachelor of Computer Application** during the year----------from Govt. V.Y.T. P.G. Autonomous College, Durg (C.G.) affiliated to Hemchand Yadav Vishwavidyalaya, Durg (C.G.).

(Head Name)

3. Certificate from the Guide in letter head

CERTIFICATE

This is to certify that the Project work entitled "_----------_"
Submitted to the (College Name) by Mr/Ms/Mrs----------Roll No ----------
----------in partial fulfillment for the requirements relating to nature and standard of award of Bachelor of Computer Application degree by, Govt. V.Y.T. P.G. Autonomous College, Durg (C.G.) affiliated to Hemchand Yadav Vishwavidyalaya, Durg (C.G.) for the academic year 2021-2022.

This project work has been carried out under my guidance.

(Guide Name)

4. Certificate of the company or Organisation from where the Project is done from the Project Manager or Project guide.

5. Certificate of evaluation in the department letter head

CERTIFICATE OF EVALUATION

This is to certify that the Project work entitled "_____" is carried out Mr/Ms/Mrs _____, a student of BCA-III year at (College Name), after proper evaluation and examination, is hereby approved as a credible work in the discipline of Computer Science and Application and is done in a satisfactory manner for its acceptance as a requisite for the award of degree of Bachelor of Computer Application during the year_____ from Govt. V.Y.T. P.G. Autonomous College, Durg (C.G.) affiliated to Hemchand Yadav Vishwavidyalaya, Durg (C.G.)

Internal Examiner **External Examiner**

6. Declaration of Student/Self Certificate

DECLARATION

This is to certify that the Project work entitled "_____", which is submitted by me in partial fulfillment for the award of degree of Bachelor of Computer Application, (College Name), comprises the original work carried out by me.

I further declare that the work reported in this project has not been submitted and will not be submitted, either in part or in full for the award of any other degree or diploma in this Institute or any other Institute or University.

Place :
Date :

(Student Name)
(Roll No)

7. Acknowledgement

In the "Acknowledgement" page, the writer recognizes his/her indebtedness for guidance and assistance of the thesis/report adviser and other members of the faculty. Courtesy demands that he/she also recognize specific contributions by other persons or institutions such as libraries and research foundation. Acknowledgements should be simple, tastefully and tactfully.

Name and Signatures

V.C. Nominee	**Departmental members**
Subject Expert ..... (D. PRAD)	**7. HOD-Mr. Durgesh Kumar Kotangle** .....
Subject Expert.....	**8. Mr. Dileep Kumar Sahu** .....
Alumni(member).....	**9. Mrs. Latika Tamrakar** .....
Prof. from other Dept. of Sc. Faculty	
Specialist from Industry	