KARNATAK UNIVERSITY, DHARWAD
ACADEMIC (S&T) SECTION
ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯ, ಧಾರವಾಡ
ವಿದ್ಯಾಮಂಡಳ (ಎಸ್&ಟಿ) ವಿಭಾಗ

Tele: 0836-2215224
e-mail: academic.st@kud.ac.in

Pavate Nagar,Dharwad-580003
ಪಾವಟೆ ನಗರ, ಧಾರವಾಡ – 580003

NAAC Accredited
'A' Grade 2014

website: kud.ac.in

No. KU/Aca(S&T)/SSL-394A/2022-23/1056   Date: **2 3 SEP 2022**

ಅಧಿಸೂಚನೆ

ವಿಷಯ: 2022–23ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಎಲ್ಲ ಸ್ನಾತಕ ಕೋರ್ಸಗಳಿಗೆ 3 ಮತ್ತು 4ನೇ ಸೆಮೆಸ್ಟರ್ NEP-2020 ಮಾದರಿಯ ಪಠ್ಯಕ್ರಮವನ್ನು ಅಳವಡಿಸಿರುವ ಕುರಿತು.

ಉಲ್ಲೇಖ: 1. ಸರ್ಕಾರದ ಅಧೀನ ಕಾರ್ಯದರ್ಶಿಗಳು(ವಿಶ್ವವಿದ್ಯಾಲಯ 1) ಉನ್ನತ ಶಿಕ್ಷಣ ಇಲಾಖೆ ಇವರ ಆದೇಶ ಸಂಖ್ಯೆ: ಇಡಿ 260 ಯುಎನ್‌ಇ 2019(ಭಾಗ–1), ದಿ:7.8.2021.

2. ವಿಜ್ಞಾನ & ತಂತ್ರಜ್ಞಾನ ನಿಖಾಯ ಸಭೆಯ ಠರಾವುಗಳ ದಿನಾಂಕ: 06.09.2022

3. ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ನಿರ್ಣಯ ಸಂ. 01, ದಿನಾಂಕ: 17.09.2022

4. ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶ ದಿನಾಂಕ: **22-09-2022**

_____

ಮೇಲ್ಕಾಣಿಸಿದ ವಿಷಯ ಹಾಗೂ ಉಲ್ಲೇಖಗಳನ್ವಯ ಮಾನ್ಯ ಕುಲಪತಿಗಳ ಆದೇಶದ ಮೇರೆಗೆ, 2022–23ನೇ ಶೈಕ್ಷಣಿಕ ಸಾಲಿನಿಂದ ಅನ್ವಯವಾಗುವಂತೆ, **ವಿಜ್ಞಾನ & ತಂತ್ರಜ್ಞಾನ** ನಿಖಾಯದ ಎಲ್ಲ ಸ್ನಾತಕ ಕೋರ್ಸಗಳ ರಾಷ್ಟ್ರೀಯ ಶಿಕ್ಷಣ ನೀತಿ (NEP)-2020 ರಂತೆ 3 ಮತ್ತು 4ನೇ ಸೆಮೆಸ್ಟರ್‌ಗಳಿಗಾಗಿ ವಿಶೇಷ ವಿದ್ಯಾವಿಷಯಕ ಪರಿಷತ್ ಸಭೆಯ ಅನುಮೋದಿತ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಪ್ರಕಟಪಡಿಸಿದ್ದು, ಸದರ ಪಠ್ಯಕ್ರಮಗಳನ್ನು ಕ.ವಿ.ವಿ. www.kud.ac.in ಅಂತರ್ಜಾಲದಿಂದ ಡೌನಲೋಡ ಮಾಡಿಕೊಳ್ಳಲು ಸೂಚಿಸುತ್ತಾ, ವಿದ್ಯಾರ್ಥಿಗಳು ಹಾಗೂ ಸಂಬಂಧಿಸಿದ ಎಲ್ಲ ಬೋಧಕರ ಗಮನಕ್ಕೆ ತಂದು ಅದರಂತೆ ಕಾರ್ಯಪ್ರವೃತ್ತರಾಗಲು ಕವಿವಿ ಅಧೀನದ / ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ ಸೂಚಿಸಲಾಗಿದೆ.

ಅಡಕ: ಮೇಲಿನಂತೆ

ಕುಲಸಚಿವರು.

ಗೆ,

ಕರ್ನಾಟಕ ವಿಶ್ವವಿದ್ಯಾಲಯದ ವ್ಯಾಪ್ತಿಯಲ್ಲಿ ಬರುವ ಎಲ್ಲ ಅಧೀನ ಹಾಗೂ ಸಂಲಗ್ನ ಮಹಾವಿದ್ಯಾಲಯಗಳ ಪ್ರಾಚಾರ್ಯರುಗಳಿಗೆ. (ಕ.ವಿ.ವಿ. ಅಂತರ್ಜಾಲ ಹಾಗೂ ಮಿಂಚಂಚೆ ಮೂಲಕ ಬಿತ್ತರಿಸಲಾಗುವುದು)

ಪ್ರತಿ:

1. ಕುಲಪತಿಗಳ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

2. ಕುಲಸಚಿವರ ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

3. ಕುಲಸಚಿವರು (ಮೌಲ್ಯಮಾಪನ) ಆಪ್ತ ಕಾರ್ಯದರ್ಶಿಗಳು, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

4. ಅಧೀಕ್ಷಕರು, ಪ್ರಶ್ನೆ ಪತ್ರಿಕೆ / ಗೌಪ್ಯ / ಜಿ.ಎ.ಡಿ. / ವಿದ್ಯಾಂಡಳ (ಪಿ.ಜಿ.ಪಿಎಚ್.ಡಿ) ವಿಭಾಗ, ಸಂಬಂಧಿಸಿದ ಕೋರ್ಸಗಳ ವಿಭಾಗಗಳು ಪರೀಕ್ಷಾ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

5. ನಿರ್ದೇಶಕರು, ಕಾಲೇಜು ಅಭಿವೃದ್ಧಿ / ವಿದ್ಯಾರ್ಥಿ ಕಲ್ಯಾಣ ವಿಭಾಗ, ಕ.ವಿ.ವಿ. ಧಾರವಾಡ.

KARNATAK UNIVERSITY, DHARWAD

04 - Year BCA Program

***

SYLLABUS

Course: Computer Applications

With Effect from 2021-22

DISCIPLINE SPECIFIC CORE COURSE (DSCC) FOR SEM III & IV,

OPEN ELECTIVE COURSE (OEC) FOR SEM III & IV and

SKILL ENHANCEMENT COURSE (SEC) FOR SEM III

AS PER N E P - 2020

Karnatak University, Dharwad
Four Years Under Graduate Program in BCA.(Hons.) as per NEP-2020
With Effect from 2022-23

Semester	Course	Course Code	Paper Code	Paper Title Theory/Practical	Credits	No. of Hrs/ Week Theory/ Practical	Total Hours	Duration of Exam in Hrs Theory/ Practical	Internal Assessment Marks Theory/ Practical	Marks for Final Exam Theory/ Practical	Total Marks
III	DSCC-09	BCA-3.1	053BCA011	Database Management Systems	4	4	52	2 hrs.	40	60	100
	DSCC-10	BCA-3.2	053BCA012	DBMS Lab	2	4	52	3 hrs.	25	25	50
	DSCC-11	BCA-3.3	053BCA013	Object Oriented Programming using JAVA	4	4	52	2 hrs.	40	60	100
	DSCC-12	BCA-3.4	053BCA014	JAVA Lab	2	4	52	3 hrs.	25	25	50
	OEC-3	BCA-3.6	003BCA051	Python Programming Concepts	3	3	52	2 hrs.	40	60	100
	SEC -2	BCA-3.7	053BCA061	Open Source Tools (SEC-Model 2)	2	1T + 2P	39	2 hrs.	25	25	50
IV	DSCC-13	BCA-4.1	054BCA011	Python Programming	4	4	52	2 hrs.	40	60	100
	DSCC-14	BCA-4.2	054BCA012	Python Programming Lab	2	4	52	3 hrs.	25	25	50
	DSCC-15	BCA-4.3	054BCA013	Computer Multi Media and Animation	4	4	52	2 hrs.	40	60	100
	DSCC-16	BCA-4.4	054BCA014	Computer Multi Media and Animation Lab	2	4	52	3 hrs.	25	25	50
	OEC-4	BCA-4.5	004BCA051	Electronic Commerce	3	3	52	2 hrs.	40	60	100

Programme Specific Outcome (PSO):

On completion of the 03/ 04 years Degree in Computer Science students will be able to:

PSO 1 **:** Understand basic concepts involved in computing.

PSO 2 **:** Apply the knowledge in computer techniques to solve real world problems.

PSO 3 **:** Think of new approaches for solving problems in different domains.

PSO 4 **:** Follow ethics in designing software with team members.

PSO 5 **:** Develop research oriented skills

PSO 6 **:** Understand good lab practices

BCA Semester –III

Discipline Specific Course (DSC)

The course DSCC in III semester has two papers (Theory Paper –I for 04 credits & Practical Paper -II for 2 credits) for 06 credits: Both the papers are compulsory. Details of the courses are as under.

Course No.3 (Theory): Database Management Systems (DBMS)
Course Code: 053BCA011

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-03	DSCC-9	Theory	04	04	52 hrs.	2 hrs.	40	60	100

Course Outcomes (COs):

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

CO 1: Explain the various database concepts and the need for database systems.

CO 2: Identify and define database objects, enforce integrity constraints on a database using DBMS.

CO 3: Demonstrate a Data model and Schemas in RDBMS.

CO 4: Identify entities and relationships and draw ER diagram for a given real-world problem.

CO 5: Convert an ER diagram to a database schema and deduce it to the desired normal form.

CO 6: Formulate queries in Relational Algebra, Structured Query Language (SQL) for database manipulation.

CO 7: Explain the transaction processing and concurrency control techniques.

DSCC 5: Database Management System (DBMS)

Unit I	**Database Architecture:** Introduction to Database system applications. Characteristics and Purpose of database approach. People associated with Database system. Data models. Database schema. Database architecture. Data independence. Database languages, interfaces, and classification of DBMS.	13 hrs.
Unit II	**E-R Model:** Entity-Relationship modeling: E – R Model Concepts: Entity, Entity types, Entity sets, Attributes, Types of attributes, key attribute, and domain of an attribute. Relationships between the entities. Relationship types, roles and structural constraints, degree and cardinality ratio of a relationship. Weak entity types, E -R diagram.	13 hrs.

Unit III	**Relational Data Model:** Relational model concepts. Characteristics of relations. Relational model constraints: Domain constrains, key constraints, primary & foreign key constraints, integrity constraints and null values. Relational Algebra: Basic Relational Algebra operations. Set theoretical operations on relations. JOIN operations Aggregate Functions and Grouping. Nested Sub Queries-Views. Introduction to PL/SQL & programming of above operations in PL/SQL	13 hrs.
Unit IV	**Data Normalization:** Anomalies in relational database design. Decomposition. Functional dependencies. Normalization. First normal form, Second normal form, Third normal form. Boyce-Codd normal form. **Query Processing Transaction Management:** Introduction Transaction Processing. Single user & multiuser systems. Transactions: read & write operations. Need of concurrency control: The lost update problem, Dirty read problem. Types of failures. Transaction states. Desirable properties (ACID properties) of Transactions. Concurrency Control Techniques: Locks and Time stamp Ordering. Deadlock & Starvation.	13 hrs.

References:
1. Fundamentals of Database Systems, Ramez Elamassri, Shankant B. Navathe, 7th Edition, Pearson, 2015
2. An Introduction to Database Systems, Bipin Desai, Galgotia Publications, 2010.
3. Introduction to Database System, C J Date, Pearson, 1999.
4. Database Systems Concepts, Abraham Silberschatz, Henry Korth, S.Sudarshan, 6th Edition, McGraw Hill, 2010.
5. Database Management Systems, Raghu Rama Krishnan and Johannes Gehrke, 3rd Edition, McGraw Hill, 2002

BCA Semester –III

Discipline Specific Course (DSC)

Course No.3 (Practical): Database Management Systems (DBMS) Lab
Course Code: 053BCA012

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-03	DSCC-10	Practical	02	04	52 hrs.	3 hrs.	25	25	50

Course Outcomes (COs):

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

CO: Student would be able to create a table, execute queries and PL/SQL programs.

Programs:

1. A)Create the following relation for the student:

    Student(regno:string,name:string,class:string,bdate:date,marks1:int,marks1:int,marks2:int, marks3:int)
   Create the above tables by properly specifying the primary keys & foreign keys.

    i.   Enter at least five tuples of the above relation
    ii.   Demonstrate the usage of following clauses for the above relation
            a. Where   c. Having
            b. Order By   d. GroupBy
    iii.   Demonstrate the usage of following clauses for the above relation
            a. Sum   c. Count   e. Between
            b. Avg   d. Like   f. Max & Min
    iv.   Demonstrate the rollback and commit command for the above relation

    B) Consider the following database that maintain information about employees &
        Departments.
        Employee(empid:int,ename:string,age:int,salary:int,#deptno:int)Department(deptno:int,d name:string,#manager-id:int)
   Create the above tables by properly specifying the primary keys &foreign keys.

    i.   Enter at least 5 tuples for each relation.
    ii.   Display emp-id & emp name whose salary lies between10,000 and 50,000.
    iii.   List emp name &salary for all the employee working for CS Dept.
    iv.   Display emp name &dept name for all the manager
   Write PL/SQL program to insert a new row (INSERT INTO command).

2. Consider the following schema for Order Database:
    SALESMAN(Salesman_id,Name,City,Commission)CUSTOMER(Customer_i, Cust_Name, City, Grade, Salesman_id)
    ORDERS(Ord_No, Purchase_Amt, Ord_Date, #Customer_id,Salesman_id)
   Create the above tables by properly specifying the primary keys & foreign keys.   Enter at least
        five tables for each relation.

Write SQL queries to

    i.   Count the customers with grades above Bangalore's average.

    ii.   Find the name and numbers of all salesmen who had more than one customer.

    iii. List all salesmen and indicate those who have and don't have customers in their cities (Use UNION operation.)

    iv. Create a view that finds the sales man who has the customer with the highest order of a day.

    v.   Demonstrate the DELETE operation by removing salesman with id 1000. All his orders must also be deleted.

Write PL/SQL program to demonstrate **%ROWCOUNT attribute.**

3.   Consider the

      Insurances database given below. The primary keys are underlined   and the data types are specified.

PERSON(<u>DRIVER- D#</u>:string, name:string, address:string) CAR (<u>Regno</u>: string, model: string,year:int) ACCIDENT(<u>report-number</u>: int, date:date, location:string) OWNS(#driver-id:string, #Regno: string) PARTICIPATED (#driver-id:string, #Regno: string, #report-number: int, Damage amount:int)

Create the above tables by property specifying the primary keys and the foreign keys.
Enter at least five tables for each relation.

Write SQL queries to

    i.   Demonstrate how you

    a.   Update the damage amount for the car with a specific Reg. no in the accident with report number 12 to 25000.

    b.   Add a new accident to the database.

    ii.   Find the total number of people who owned cars that were involved in accident sin 2002.

    iii. Find the total number of accidents in which cars belonging to a specific model were involved.

Write PL/SQL program demonstrate exception handling for the above query v.

----

4.   The following tables are maintained by a book dealer.

AUTHOR(<u>author-id</u>:int,name:string,city:string,country:string)PUBLISHER(<u>publisher-id</u>:int,name:string,city:string,country:string)CATALOG(<u>book-id</u>:int,title:string,author-id#:int,publisher-id#:int, category-id#:int,year:int,price:int) CATEGORY(<u>category-id</u>:int, description: string) ORDER-DETAILS(<u>order-no</u>:int, #book-id:int, quantity:int)

Create the above tables by properly specifying the primary keys and the foreign keys.
Enter at least five tuples for each relation.

Write SQL queries to

    i.   Give the details of the authors who have 2or more books in the catalog and the price of the books is greater than the average price of the books in the catalog.

    ii.   Find the author of the book, which has maximum sales.

    iii.   Demonstrate how you increase the price of books published by a specific publisher by10%.

Write PL/SQL program illustrates how to create and call a function.

5. Consider the following database of student enrolment in courses and books adopted each course.

    STUDENT(regno: string, name:string, major: string, bdate: date)

    COURSE (course: int, cname: string, dept: string)

    ENROLL (#regno: string, course#:int, sem: int marks:int)

    TEXT(book-ISBN: int,book-title: string, publisher: string, author:string) BOOK_ADOPTION (course#:int, sem:int, book-ISBN#:int)

Create the above tables by properly specifying the primary keys and the foreign Keys

Enter at least five tuples for each relation.

Write SQL queries to

    i.   Demonstrate how you add a textbook to the database and make this book be adapted by some department.

    ii.   Produce list of textbooks (include Course#, Book-ISBN, Book-title) in the alphabetical order for courses offered by the CS department that use more than two books.

    iii.   List any department that has its adopted books published by a specific publisher.

Write PL/SQL program to demonstrate user defined exception handling.

6. Consider the following database for library management system

    BOOK(Book_id,Title,Publisher_Name,Pub_Year)BOOK_AUTHORS(#Book_id,Author_Name)PUBLISHER(Name,Address,Phone)

    BOOK_COPIES(#Book_id,#Branch_id,No-of_Copies)BOOK_LENDING(#Book_id,#Branch_id,Card_No,Date_Out,Due_Date)

    LIBRARY_BRANCH(Branch_id,Branch_Name,Address)

Create the above tables by properly specifying the primary keys and the foreign Keys

    Enter at least five tuples for each relation.

    Write SQL queries to

    i.   Retrieve details of all books in the library–id, title, name of publisher, authors, number of copies in each branch, etc.

    ii.   Get the particulars of borrowers who have borrowed more than 3 books, but from Jan 2017 to Jun2017

    iii.   Delete a book in BOOK table. Update the contents of other tables to reflect this data manipulation operation.

    iv.   Create a view of all books and its number of copies that a recurrently available in the Library.

Write PL/SQL program to demonstrate implicit **cursor.**

7. Consider the schema for Company Database:

EMPLOYEE(SSN,Name,Address,Sex,Salary,#SuperSSN,DNo)DEPARTMENT(
DNo, DName, MgrSSN, MgrStartDate) DLOCATION(#DNo ,DLoc)
PROJECT (PNo, PName, PLocation, #DNo)WORKS_ON(#SSN, #PNo, Hours)

Create the above tables by properly specifying the primary keys and the foreign Keys
Enter at least five tuples for each relation.
Write SQLq ueries to
   i. Make a list of all project numbers for projects that involve an employee whose last name
      is 'Scott', either as a worker or as a manager of the department that controls the project.
   ii. Show the resulting salaries if every employee working on the 'IoT' project is given
       a10percentraise.
   iii. Find the sum of the salaries of all employees of the 'Accounts' department,
   as well as the maximum salary, the minimum salary, and the average salary in
   this department.
   iv. Create a view with columns dept name and dept location. Display name of dept located
       in 'Dharwad' on this view.

Write PL/SQL program to demonstrate explicit cursor.

Note: Draw E R diagram and Schema diagram for each database application**.**

Evaluation Scheme for Lab Examination:
General instructions:

Scheme of Practical Examination (distribution of marks): 25 marks for Semester end
examination
   1. **7 Marks (Program 1 + Execution without error)**
   2. **7 Marks (Program 2 + Execution without error)**
   3. **Viva 6 Marks**
   4. **Journal 5 Marks**

   Total 25 marks

Note: Same Scheme may be used for IA (Formative Assessment) examination

BCA Semester –III

Discipline Specific Course (DSC)

The course DSCC in III semester has two papers (Theory Paper –I for 04 credits & Practical Paper -II for 2 credits) for 06 credits: Both the papers are compulsory. Details of the courses are as under.

Course No.3 (Theory): Object Oriented Programming using JAVA
Course **Code: 053BCA013**

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-03	DSCC-11	Theory	04	04	52 hrs	2 hrs.	40	60	100

Course Outcomes (COs):

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

CO 1:　　Explain the object-oriented concepts using JAVA.

CO 2:　　Write JAVA programs using OOP concepts like Abstraction, Encapsulation,

CO 3:　　Inheritance and Polymorphism.

CO 4:　　Implement Classes and multithreading using JAVA.

CO 5:　　Demonstrate the basic principles of creating Java applications with GUI.

DSC2: Object Oriented Programming using JAVA

Unit I	**Introduction to Java:** Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java. **Objects and Classes:** Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, Inbuilt classes like String, Character, String Buffer, File, this reference.	13 hrs.
Unit II	**Inheritance and Polymorphism:** Inheritance in java, Super and sub class, Overriding, Object class, Polymorphism, Dynamic binding, Generic programming, Casting objects, Instance of operator, Abstract class, Interface in java, Package in java, UTIL package.	13 hrs.
Unit III	**Event and GUI programming:** Event handling in java, Event types, Mouse and key events, GUI Basics, Panels, Frames, Layout Managers: Flow Layout, Border Layout, Grid Layout, GUI components like Buttons, Check Boxes, Radio Buttons, Labels, Text Fields, Text Areas, Combo Boxes, Lists, Scroll Bars, Sliders, Windows, Menus, Dialog Box, Applet and its life cycle, Introduction to swing, Exceptional handling mechanism.	13 hrs.

Unit IV	**I/O programming:** Text and Binary I/O, Binary I/O classes, Object I/O, Random Access Files. Multithreading in java: Thread life cycle and methods, Runnable interface, Thread synchronization, Exception handling with try catch-finally, Collections in java, Introduction to JavaBeans and Network Programming	13 hrs.

References:

1. Programming with Java, By E Balagurusamy – A Primer, 4th Edition, McGraw Hill Publication.
2. Core Java Volume I – Fundamentals, By Cay S. Horstmann, Prentice Hall.
3. Object Oriented Programming with Java: Somashekara M.T., Guru, D.S., Manjunatha K.S, 1st Edition, PHI Learning 2017.
4. Java 2 - The Complete Reference, Herbert Schildt, 5th Edition, McGraw Hill Publication, 2017.
5. Java - The Complete Reference, Herbert Schildt, 7th Edition, McGraw Hill Publication, 2017.

BCA Semester –III

Discipline Specific Course (DSC)

Course No.3 (Practical): JAVA Lab
Course **Code: 053BCA014**

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-03	DSCC-12	Practical	02	04	52 hrs.	3 hrs.	25	25	50

Course Outcomes (COs):

Operators, Decision making and Loops:

1. Write a Java program to read the radius of a circle and to find the area and circumference.
2. Write a program to demonstrate String Operators
3. Write a Java program to find N prime numbers reading N as command line argument.
4. Write a program to find factorial of N numbers reading N as command line argument.
5. Write a program to read N numbers and sort them using one-dimensional arrays.

Classes and Methods:

6. Write a Java program to illustrate Method Overloading.
7. Write a Java program to illustrate Operator Overloading.
8. Write a program to demonstrate Single Inheritance.
9. Write a program to illustrate Constructor Overloading
10. Write a program to illustrate Method Overriding

Packages, Threads and Exception Handling:

11. Write a Java program demonstrating Multithreading.
12. Write a Java program demonstrating Exception Handling.
13. Write a Java program to demonstrate user defined package program.

Java Applet Programming

14. Write an Applet program to display Geometrical Figures using objects.
15. Write an Applet program which illustrate Scroll bar object.
16. Write an Applet program to change the background color randomly.
17. Write an Applet program to change the color of applet using combo box.
18. Write an Applet program to implement Digital Clock using thread.

Event Handling:

19.   Write an Applet program to implement Mouse events.
20.   Write an Applet program to implement Keyboard events.

Evaluation Scheme for Lab Examination:
General instructions:

Scheme of Practical Examination (distribution of marks): 25 marks for Semester end examination

1. **7 Marks (Program 1 + Execution without error)**

2. **7 Marks (Program 2 + Execution without error)**

3. **Viva 6 Marks**

4. **Journal 5 Marks**

       Total 25 marks

Note: Same Scheme may be used for IA (Formative Assessment) examination

BCA Semester – III
Open Elective Course (OEC-3)
(OEC for other students)

OEC-3: Title of the Course: Python Programming Concepts
Course Code: 003BCA051

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
OEC-3	OEC-3	Theory	03	03	52 hrs	2 hrs	40	60	100

Course Outcomes (COs):

CO 1: Explain the fundamentals of Computers.

CO 2: Explain the basic concepts of Python Programming.

CO 3: Demonstrate proficiency in the handling of loops and the creation of functions.

CO 4: Identify the methods to create and store strings.

Unit I	**Fundamentals of Computers:** Introduction to Computers - Computer Definition, Characteristics of Computers, Evolution and History of Computers, Types of Computers, Basic Organization of a Digital Computer; Number Systems – different types, conversion from one number system to another; Computer Codes – BCD, Gray Code, ASCII and Unicode; Boolean Algebra – Boolean Operators with Truth Tables; Types of Software – System Software and Utility Software; Computer Languages - Machine Level, Assembly Level & High Level Languages, Translator Programs – Assembler, Interpreter and Compiler; Planning a Computer Program - Algorithm, Flowchart and Pseudo code with Examples.	**13 hrs.**
Unit II	**Python Basics:** Introduction to Features and Applications of Python; Python Versions; Installation of Python; Python Command Line mode and Python IDEs; Simple Python Program. Identifiers; Keywords; Statements and Expressions; Variables; Operators; Precedence and Association; Data Types; Indentation; Comments; Built-in Functions- Console Input and Console Output, Type Conversions; Python Libraries; Importing Libraries with Examples; Illustrative programs.	**13 hrs.**
Unit III	**Python Control Flow:** Types of Control Flow; Control Flow Statements- if, else, elif, while loop, break, continue statements, for loop Statement; range() and exit () functions; Illustrative programs.	**13 hrs.**

Unit IV	**Python Functions Strings:** Types of Functions; Function Definition- Syntax, Function Calling, Passing Parameters/ arguments, the return statement; Default Parameters; Command line Arguments; Key Word Arguments; Illustrative programs. Creating and Storing Strings; Accessing Sting Characters; the str() function; Operations on Strings- Concatenation, Comparison, Slicing and Joining, Traversing; Format Specifiers; Escape Sequences; Raw and Unicode Strings; Python String Methods; Illustrative programs.	**13 hrs.**

References

1. Computer Fundamentals (BPB), P. K. Sinha & Priti Sinha
2. Think Python How to Think Like a Computer Scientist, Allen Downey et al., 2nd Edition, Green Tea Press. Freely available online 2015. @https://www.greenteapress.com/thinkpython/thinkCSpy.pdf
3. Introduction to Python Programming, Gowrishankar S et al., CRC Press, 2019.
4. http://www.ibiblio.org/g2swap/byteofpython/read/
5. http://scipy-lectures.org/intro/language/python_language.html
6. https://docs.python.org/3/tutorial/index.html

BCA Semester – III
Skill Enhancement Course (SEC-2)

SEC-2: Title of the Course: Open Source Tools
Course Code: 053BCA061

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
SEC	SEC-2	Theory	03	03	52 hrs	2hrs	40	60	100

Course Outcomes (COs):
CO 1:   Recognize the benefits and features of Open Source Technology and to interpret, contrast and compare open source products among themselves
CO 2:   Use appropriate open source tools based on the nature of the problem
CO 3:   Write code and compile different open-source software.

Course Content (Open Source Tools)

Module	Details of topic	Duration
Module 1: Open Source Softwares	i. Introduction to Open sources, Need of Open Sources, Open Source –Principles, Standard Requirements, Advantages of Open Sources – ii. Free Software – FOSS iii. Licenses – GPL, LGPL, Copyrights, Patents, Contracts & Licenses and Related Issues iv. Application of Open Sources. Open Source Operating Systems : FEDORA, UBUNTU	05 hours
Module 2: Programming Tools And Techniques	i. Usage of design Tools like Argo UML or equivalent ii. Version Control Systems like Git or equivalent iii. Bug Tracking Systems (Trac, BugZilla) iv. Boot Strap	04 hours
Module 3: Case Studies	**i.** Apache ii. Berkeley Software Distribution iii. Mozilla (Firefox) iv. Wikipedia v. Joomla vi. GNU Compiler Collection vii. Libre Office	04 hours

Text Book:
1. KailashVadera, Bhavyesh Gandhi, "Open Source Technology", Laxmi Publications Pvt. Ltd 2012, 1st Edition.

Reference Book:
1. Fadi P. Deek and James A. M. McHugh, "Open Source: Technology and Policy", Cambridge Universities Press 2007.

BCA Semester –IV

Discipline Specific Course (DSC)

The course DSCC in IV semester has two papers (Theory Paper –I for 04 credits & Practical Paper -II for 2 credits) for 06 credits: Both the papers are compulsory. Details of the courses are as under.

Course No.4 (Theory): Python Programming
Course Code: 054BCA011

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-04	DSCC-13	Theory	04	04	52 hrs	2 hrs.	40	60	100

Course Outcomes (COs):

At the end of the course, students will be able to:
CO 1: Explain the basic concepts of Python Programming.
CO 2: Demonstrate proficiency in the handling of loops and creation of functions.
CO 3: Identify the methods to create and manipulate lists, tuples and dictionaries.
CO 4: Discover the commonly used operations involving file handling.
CO 5: Interpret the concepts of Object-Oriented Programming as used in Python.
CO 6: Develop the emerging applications of relevant fields using Python.

DSC10: Python Programming

Unit I	**Introduction** to Features and Applications of Python; Python Versions; Installation of Python; Python Command Line mode and Python IDEs; Simple Python Program. **Python Basics:** Identifiers; Keywords; Statements and Expressions; Variables; Operators; Precedence and Association; Data Types; Indentation; Comments; Built-in Functions- Console Input and Console Output, Type Conversions; Python Libraries; Importing Libraries with Examples. Python Control Flow: Types of Control Flow; Control Flow Statements- if, else, elif, while loop, break, continue statements, for loop Statement; range () and exit () functions.	13 hrs.
Unit II	**Exception Handling:** Types of Errors; Exceptions; Exception Handling using try, except and finally. **Python Functions:** Types of Functions; Function Definition- Syntax, Function Calling, Passing Parameters/arguments, the return statement; Default Parameters; Command line Arguments; Key Word Arguments; Recursive Functions; Scope and Lifetime of Variables in Functions. **Strings:** Creating and Storing Strings; Accessing Sting Characters; the str() function; Operations on Strings- Concatenation, Comparison, Slicing and Joining, Traversing; Format Specifiers; Escape Sequences; Raw and Unicode Strings; Python String Methods.	13 hrs.

Unit III	**Lists:** Creating Lists; Operations on Lists; Built-in Functions on Lists; Implementation of Stacks and Queues using Lists; Nested Lists. Dictionaries: Creating Dictionaries; Operations on Dictionaries; Built-in Functions on Dictionaries; Dictionary Methods; Populating and Traversing Dictionaries. **Tuples and Sets:** Creating Tuples; Operations on Tuples; Built-in Functions on Tuples; Tuple Methods; Creating Sets; Operations on Sets; Built-in Functions on Sets; Set Methods. **File Handling:** File Types; Operations on Files– Create, Open, Read, Write, Close Files; File Names and Paths; Format Operator. **Object Oriented Programming:** Classes and Objects; Creating Classes and Objects; Constructor Method; Classes with Multiple Objects; Objects as Arguments; Objects as Return Values; Inheritance- Single and Multiple Inheritance, Multilevel and Multipath Inheritance; Encapsulation- Definition, Private Instance Variables; Polymorphism- Definition, Operator Overloading.	13 hrs.
Unit IV	**GU Interface:** The tkinter Module; Window and Widgets; Layout Management- pack, grid and place. **Python SQLite:** The SQLite3 module; SQLite Methods- connect, cursor, execute, close; Connect to Database; Create Table; Operations on Tables- Insert, Select, Update. Delete and Drop Records. **Data Analysis:** NumPy- Introduction to NumPy, Array Creation using NumPy, Operations on Arrays; Pandas- Introduction to Pandas, Series and DataFrames, Creating DataFrames from Excel Sheet and .csv file, Dictionary and Tuples. Operations on DataFrames. **Data Visualisation:** Introduction to Data Visualisation; Matplotlib Library; Different Types of Charts using Pyplot- Line chart, Bar chart and Histogram and Pie chart.	13 hrs.

References:

1. Think Python How to Think Like a Computer Scientist, Allen Downey et al., 2nd Edition, Green Tea Press. Freely available online @ https://www.greenteapress.com/thinkpython/thinkCSpy.pdf, 2015.
2. Introduction to Python Programming, Gowrishankar S et al., CRC Press, 2019.
3. Python Data Analytics: Data Analysis and Science Using Pandas, matplotlib, and the Python Programming Language, Fabio Nelli, Apress®, 2015
4. Advance Core Python Programming, Meenu Kohli, BPB Publications, 2021.
5. Core PYTHON Applications Programming, Wesley J. Chun, 3rd Edition, Prentice Hall, 2012.
6. Automate the Boring Stuff, Al Sweigart, No Starch Press, Inc, 2015.
7. Data Structures and Program Design Using Python, D Malhotra et al., Mercury Learning and Information LLC, 2021.
8. http://www.ibiblio.org/g2swap/byteofpython/read/
9. https://docs.python.org/3/tutorial/index.html

BCA Semester –IV
Discipline Specific Course (DSC)

Course No.4 (Practical): Python Programming Lab
Course Code: 054BCA012

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-04	DSCC-14	Practical	02	04	52 hrs.	3 hrs.	25	25	50

Programs for Practical Component:

Part-A
1. Check if a number belongs to the Fibonacci Sequence
2. Solve Quadratic Equations
3. Find the sum of n natural numbers
4. Display Multiplication Tables
5. Check if a given number is a Prime Number or not
6. Implement a sequential search
7. Create a calculator program
8. Explore string functions
9. Implement Selection Sort
10. Implement Stack
11. Read and write into a file

Part-B
1. Demonstrate usage of basic regular expression
2. Demonstrate use of advanced regular expressions for data validation.
3. Demonstrate use of List
4. Demonstrate use of Dictionaries
5. Create SQLite Database and Perform Operations on Tables
6. Create a GUI using Tkinter module
7. Demonstrate Exceptions in Python
8. Drawing Line chart and Bar chart using Matplotlib
9. Drawing Histogram and Pie chart using Matplotlib
10. Create Array using Num Py and Perform Operations on Array
11. Create Data Frame from Excel sheet using Pandas and Perform Operations on Data Frames

Evaluation Scheme for Lab Examination:
General instructions:
Scheme of Practical Examination (distribution of marks): 25 marks for Semester end examination
1. **7 Marks (Program 1 + Execution without error)**
2. **7 Marks (Program 2 + Execution without error)**
3. **Viva 6 Marks**
4. **Journal 5 Marks**
     Total 25 marks
Note: Same Scheme may be used for IA (Formative Assessment) examination

BCA Semester –IV

Discipline Specific Course (DSC)

The course DSCC in IV semester has two papers (Theory Paper –I for 04 credits & Practical Paper -II for 2 credits) for 06 credits: Both the papers are compulsory. Details of the courses are as under.

Course No.4 (Theory): Computer Multimedia and Animation
Subject Code: 054BCA013

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-04	DSCC-15	Theory	04	04	52 hrs	2 hrs.	40	60	100

Course Outcomes (COs):

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

CO 1: Write a well-designed, interactive Web site with respect to current standards and practices.

CO 2: Demonstrate in-depth knowledge of an industry-standard multimedia development tool and its associated scripting language.

CO 3: Determine the appropriate use of interactive versus standalone Web applications.

DSC15: Computer Multimedia & Animation

Unit I	Web Design: Origins and evolution of HTML, Basic syntax, Basic text markup, Images, Lists, Tables, Forms, Frame, Overview and features of HTML5. CSS: Introduction, Levels of style sheets, Style specification formats, Selector forms, Property value forms, Font properties, List properties, Color, Alignment of text, The <span> and <div> tags; Overview and features of CSS3. JavaScript: Object orientation and JavaScript; General syntactic characteristics; Primitives, operations, and expressions; Screen output and keyboard input.	13 hrs.
Unit II	Animation: Introduction to Animation. The Start and End States, Interpolation, Animations in HTML. All About CSS Animations, Creating a Simple Animation, Detailed Look at the CSS Animation Property, Key frames, Declaring Multiple Animations, Wrap-up. All About CSS Transitions, Adding a Transition, Looking at Transitions in Detail, The Longhand Properties, Longhand Properties vs. Shorthand Properties, Working with Multiple Transitions.	13 hrs.
Unit III	HTML5 – SVG: Viewing SVG Files, Embedding SVG in HTML5, HTML5 − SVG Circle, HTML5 − SVG Rectangle, HTML5 − SVG Line, HTML5 − SVG Ellipse, HTML5 − SVG Polygon, HTML5 − SVG Polyline, HTML5 − SVG Gradients, HTML5 − SVG Star.	13 hrs.

Unit IV	HTML5 – CANVAS: The Rendering Context, Browser Support, HTML5 Canvas Examples, Canvas - Drawing Rectangles, Canvas - Drawing Paths, Canvas - Drawing Lines, Canvas - Drawing Bezier Curves, Canvas - Drawing Quadratic Curves, Canvas - Using Images, Canvas - Create Gradients, HTML5 - Styles and Colors, Canvas - Text and Fonts, Canvas - Pattern and Shadow, Canvas - Save and Restore States, Canvas - Translation, Canvas - Rotation, Canvas - Scaling, Canvas - Transforms, HTML5 Canvas - Composition, Canvas – Animations.	13 hrs.

References:

1. The Complete Reference HTML and CSS, 5th Edition, Thomas A Powell, 2017.
2. Animation in HTML, CSS, and JavaScript, Kirupa Chinnathambi, 1st Edition, Createspace Independent Pub, 2013.
3. https://www.w3.org/Style/CSS/current-work#CSS3
4. http://bedford-computing.co.uk/learning/cascading-style-sheets-css/

BCA Semester –IV

Discipline Specific Course (DSC)

Course No.4 (Practical): Computer Multimedia and Animation
Subject Code: 054BCA014

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
Course-04	DSCC-16	Practical	02	04	52 hrs.	3 hrs.	25	25	50

Course Outcome (CO):
After completion of course (Practical), students will be able to:
CO: Students will learn HTML/DHTML, CSS, SVG, Canvas and JavaScript programming codes.

List of the Experiments for 52 hrs / Semesters

HTML Programs
1. Print the numbers 1 - 10, each number being a different color.
2. Use table tag to format web page. Also create the Time Table of your class using table tag.
3. Print a paragraph that is a description of a book, include the title of the book as well as its author. Names and titles should be underlined, adjectives should be italicized and bolded.
4. Print the squares of the numbers 1 - 20. Each number should be on a separate line, next to it the number 2 superscripted, an equal sign and the result. (Example: $10^2 = 100$)
5. Create links to five different pages on five different websites that should all open in a new window.

CSS Programs
6. Setting a background image for a page and setting text, background color Using CSS
7. Setting the font type of text Setting the font size of text Setting the font color of text Setting the font style of text Using CSS
8. Create a webpage with two images which alternately changes on mouse over using CSS.

Java Script
9. Write a JavaScript program to display the current day and time
10. Write a JavaScript program to convert temperatures to and from Celsius, Fahrenheit.

HTML5-SVG

11. Write a program to create a Line and Rectangle using.
12. Write a program to create a polygon, polyline.
13. Write a program to create a star .

HTML5-Canvas

14. Write a program to create a Line and Rectangle
15. Write a program to create Bezier Curves
16. Write a program to create Draw Linear Gradient
17. Write a program to rectangle translation .
18. Write a program to rectangle rotation .
19. Write a program to rectangle scaling using canvas.

Canvas-Animation

20. Write a program to rotate a small image repeatedly.

Evaluation Scheme for Lab Examination:
General instructions:

Scheme of Practical Examination (distribution of marks): 25 marks for Semester end examination

1. **7 Marks (Program 1 + Execution without error)**

2. **7 Marks (Program 2 + Execution without error)**

3. **Viva 6 Marks**

4. **Journal 5 Marks**

   Total 25 marks

Note: Same Scheme may be used for IA (Formative Assessment) examination

OEC-4: Title of the Course: ELECTRONIC COMMERCE
Subject Code: 004BCA051

Course No.	Type of Course	Theory / Practical	Credits	Instruction hour per week	Total No. of Lectures/Hours / Semester	Duration of Exam	Formative Assessment Marks	Summative Assessment Marks	Total Marks
OEC-4	OEC-4	Theory	03	03	52 hrs	2hrs	40	60	100

Course Outcomes (COs):

CO 1: Compare how internet and other information technologies support business processes.

CO 2: Demonstrate an overall perspective of the importance of application of internet technologies in business administration

CO 3: Explain the basic business management concepts.

CO 4: Demonstrate the basic technical concepts relating to E-Commerce.

CO 5: Identify the security issues, threats and challenges of E-Commerce.

UNIT I	**Introduction to E-Commerce and Technology Infrastructure:** Working of Web - HTML Markup for Structure - Creating simple page - Marking up text - Adding Links - Adding Images - Table Markup - Forms - HTML5	**13 Hrs**
UNIT II	**Building an E-Commerce Website, Mobile Site and Apps:** Systematic approach to build an E-Commerce: Planning, System Analysis, System Design, Building the system, Testing the system, Implementation and Maintenance, Optimize Web Performance – Choosing hardware and software – Other E-Commerce Site tools – Developing a Mobile Website and Mobile App	**13 Hrs**
UNIT III	**E-Commerce Security and Payment Systems:** E-Commerce Security Environment – Security threats in E-Commerce – Technology Solutions: Encryption, Securing Channels of Communication, Protecting Networks, Protecting Servers and Clients – Management Policies, Business Procedure and Public Laws - Payment Systems	**13 Hrs**

UNIT IV	**Business Concepts in E-Commerce:** Digital Commerce Marketing and Advertising strategies and tools – Internet Marketing Technologies – Social Marketing – Mobile Marketing – Location based Marketing – Ethical, Social, Political Issues in E-Commerce **Project Case Study:** Case Study: Identify Key components, strategy, B2B, B2C Models of E-commerce Business model of any e-commerce website - Mini Project : Develop E-Commerce project in any one of Platforms like Woo-Commerce, Magento or Opencart	**13 Hrs**

Text Book:

1. Kenneth C. Laudon, Carol Guercio Traver - E-Commerce, Pearson, 10th Edition, 2016

References:

1. http://docs.opencart.com/
2. http://devdocs.magento.com/
3. http://doc.prestashop.com/display/PS15/Developer+tutorials
4. Robbert Ravensbergen, ―Building E-Commerce Solutions with Woo Commerce‖, PACKT, 2nd Edition

Details of Formative assessment (IA) for DSCC theory/OEC: 40% weight age for total marks

Type of Assessment	Weight age	Duration	Commencement
Written test-1	10%	1 hr	8th Week
Written test-2	10%	1 hr	12th Week
Seminar	10%	10 minutes	--
Case study / Assignment / Field work / Project work/ Activity	10%	------	--
Total	40% of the maximum marks allotted for the paper		

Faculty of Science
04 - Year UG Honors programme: 2022-23

GENERAL PATTERN OF THEORY QUESTION PAPER FOR DSCC/ OEC
(60 marks for semester end Examination with 2 hrs duration)

Part-A
1. Question number 1-06 carries 2 marks each. Answer any 05 questions   : 10marks

Part-B
2. Question number 07- 11 carries 05Marks each. Answer any 04 questions   : 20 marks

Part-C
3. Question number 12-15 carries 10 Marks each. Answer any 03 questions   : 30 marks

(Minimum 1 question from each unit and 10 marks question may have sub
 questions for 7+3 or 6+4 or 5+5 if necessary)

Total: 60 Marks
 Note: Proportionate weight age shall be given to each unit based on number of hours prescribed.