S K E Society's
G.S.S. College, (Autonomous)
Belagavi

Bachelor of Science (B.Sc.) in Computer Science

Syllabus for III and IV Semester

w.e.f

Academic Year2025-26 onwards

Submitted by

Chairman.
Board of Studies(UG).
Bachelor of Computer Science
GSS College, Autonomous, Belagavi

Curriculum Structure for B.Sc. Computer Science of GSS COLLEGE(AUTONOMOUS)

w.e.f 2025-26

Category	Course Code	Title of the Paper	Marks			Hours / Week	Credits	Duration of Exams (Hrs.)
			IA	SEE	Total			
SEMESTER III								
DSC 3	SEPBSCCST03	JAVA Programming	20	80	100	04	03	03
	SEPBSCCSP03	Java Programming - Lab	10	40	50	04	02	03
OEC	SEPBSCCSOEC01	Computer Fundamentals	10	40	50	03	02	02
TOTAL: HOURS / CREDIT					**200**	11	**07**	
SEMESTER IV								
Category	**Course Code**	**Title of the Paper**	**Marks**			**Hours / Week**	**Credits**	**Duration of Exams (Hrs.)**
DSC 4	SEPBSCCST04	Data Base Management System	20	80	100	04	03	03
	SEPBSCCSP04	Data Base Management System - Lab	10	40	50	04	02	03
OEC	SEPBSCCSOEC02	Digital Marketing	10	40	50	03	02	02
SEC	SEPBSCCSSEC01	Office Automation	10	40	50	04	02	02
TOTAL: HOURS / CREDIT					**250**	**15**	**09**	

Syllabus for BSc III Semester

Course Title: **Java programming**	Course code: 24COM301
Total Contact Hours: 52	Course Credits: 04
Formative Assessment or IA Marks: 20	Duration of SEE/Exam: 03 Hours
Summative Assessment Marks: 80	

Course Outcomes (COs):

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

- Explain the object-oriented concepts and JAVA.
- Write JAVA programs using OOP concepts like Abstraction, Encapsulation, Inheritance and Polymorphism.
- Implement Classes and multithreading using JAVA.
- Demonstrate the basic principles of creating Java applications with GUI.

DSC3: JAVA PROGRAMMING

Unit	Description	Hours
1	**Introduction to Java:** Basics of Java programming, Data types, Variables, Operators, Control structures including selection, Looping, Java methods, Overloading, Math class, Arrays in java, scanner class	09
2	**Objects and Classes:** Basics of objects and classes in java, Constructors, Finalizer, Visibility modifiers, Methods and objects, static keyword, Inbuilt classes like String, Character, String Buffer, File, this reference.	8
3	**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.	11
4	**Event and GUI programming:** Event handling in java, Using javaFX 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, , Introduction to swing, Exceptional handling mechanism.	12
5	**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, Introduction to JavaBeans	12

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.
6. Headfirst Java Author: o/Reilly

Year	II	Course Code: 24COM302	Credits	02
Sem.	III	Course Title: JAVA PROGRAMMING LAB	Hours	40
Course Pre-requisites, ifany:		Knowledge of Programming		
Formative Assessment Marks: 10		Summative Assessment Marks: 40	Duration of ESA: 04 hrs.	

Practice Labs

1. Program to print the following triangle of numbers

```
1
1 2
1 2 3
1 2 3 4
1 2 3 4 5
```

2. Program to simple java application, to print the message,"Welcome to java"
3. Program to display the month of a year. Months of the yearshould be held in an array.
4. Program to find the area of rectangle.
5. program to demonstrate a division by zero exception
6. Program to create a user defined exception say Pay Out ofBounds.

Part A: Programming Lab – Java Fundamentals – OOPS inJAVA

1. Program to assign two integer values to X and Y. Using the "if"statement the output of the program should display a message whether X is greater than Y.
2. Program to list the factorial of the numbers 1 to 10. To calculate the factorial value, use while loop. (Hint: Fact of 4 = 4*3*2*1)
3. Program to find the area and circumference of the circle by accepting the radius from the user.
4. Program to add two integers and two float numbers. When no arguments are supplied, give a default value to calculate the sum. Use function overloading.
   Program to perform mathematical operations. Create a class called AddSub with methods to add and subtract. Createanother class called MulDiv that extends from AddSub class to use the member data of the super class. MulDiv should have methods to multiply and divide A main function should access the methods and perform the mathematical operations.
6. Program with class variable that is available for all instancesof a class. Use static variable declaration. Observe the changes that occur in the object"s member variable values.
7. Program to create a student class with following attributes; Enrollment No: Name, Mark of sub1, Mark of sub2, mark ofsub3, Total Marks. Total of the three marks must becalculated only when the student passes in all three subjects.The passing mark for each subject is 50. If a candidate fails inany one of the subjects his total mark must be declared aszero. Using this condition write a constructor for this class.Write separate functions for accepting and displaying studentdetails. In the main

method create an array of three studentobjects and display the details.

8. Write a program to demonstrate multiple inheritance and useof Implementing Interfaces
9. Illustrate creation of thread by

   a) Extending Thread class. b) Implementing RunnableInterfaces
10. Write a program to demonstrate the concept of javaBeans

PART B: Exception Handling & GUI Programming using JavaFX

1. Program to catch Negative Array Size Exception. This exception is caused when the array size is initialized to negative values.
2. Program to demonstrate exception handling with try, catch and finally.
3. Program which create and displays a message on the window
4. Program to draw several shapes in the created window
5. Program to create a 4×4 grid and fills it in with 15 buttons, each labeled with its index.
6. Program which creates a frame with two buttons father and mother. When we click the father button the name of the father, his age and designation must appear. When we click mother button similar details of mother also appear.
7. Create a frame which displays your personal details with respect to a button click
8. Program to create a window with Text Fields and Buttons. The"ADD" button adds the two integers and display the result. The "CLEAR" button shall clear all the text fields.
9. Program to create a window, when we press M or m, the window displays "Good morning", A or a, the window display's Good Afternoon", E or e, the window displays "Good Evening", N or n, the window displays "Hello".
10. Demonstrate the various mouse handling events using suitable example.

Open Elective for III Semester

Year	II	Course Code: 24COM303	Credits	02
Semester	III	Course Title: Computer Fundamentals [OEC]	Hours	48

Course Pre-requisites, if any	NA	
Formative Assessment Marks: 10	Summative Assessment Marks: 40	Duration of ESA: 02 hrs.

Course Objectives	*After completing this course satisfactorily, a student will be able to:* • Describing the components of a typical computer and explain the characteristics of each of them. • Explain the components, functions, and types of computer systems • Understand the working of operating system and the services it provides. • Understand the importance of computers in business and society. • Describe various types of networks, network standards and communication software.

Unit No.	Course Content	Hours
UNIT I	**Introduction to computers:** Definition, Characteristics of computers, Evolution of computer, Generation of Computer, Types of Computers - Microcomputers, Minicomputers, Mainframes, Super computers, Basic organization of computer – Input unit, CPU, CU, ALU, Memory unit & Output unit, Input and output Devices, Types of storage devices.	12
UNIT II	**Number System:** Introduction to Number System, Types of Number System – Binary, Octal, Decimal & Hexadecimal, Conversion from one number system to another number system for whole numbers, Computer Codes – BCD, Gray code, ASCII code & Unicode	12
UNIT III	**Software Fundamentals:** Software - Definition, Types of Software, Operating System – Definition, Introduction, Functions, Classification, Computer Languages – Machine Level Language, Assembly Level Language & High Level Language. Computer Translators – Compiler, Interpreter & Assembler	12
UNIT IV	**Computer Network Basics:** Computer Network – Definition, Types – LAN, WAN, MAN & PAN, Applications, Devices – Client, Server, Hub, Switch, Router, Topology – Bus, Ring, Star, Mesh & Hybrid, **Internet:** Definition, Services & Service providers, Logical & Physical Address, WWW, Web browser, DNS, HTTP/HTTPS, URL.	12

Recommended Leaning Resources

Text Book:

1. Pradeep K. Sinha and Priti Sinha: Computer Fundamentals (Sixth Edition), BPB Publication, 2010.
2. David Riley and Kenny Hunt, Computational thinking for modern solver, Chapman & Hall/CRC, March 2014, ISBN: 9781466587793

Reference Books:

Year	II	Course Code:	Credits	03
Semester	IV	Course Title: Database Management Systems	Hours	48

Course Pre-requisites, if any	Knowledge of C Programming.	
Formative Assessment Marks: 20	Summative Assessment Marks: 80	Duration of ESA: 03hrs.

Course Objectives	After completing this course satisfactorily, a student will be able to: • Explain the various database concepts and the need for database systems. • Identify and define database objects, enforce integrity constraints on a database using DBMS. • Demonstrate a Data model and Schemas in RDBMS. • Identify entities and relationships and draw ER diagram for a given real-world problem. • Convert an ER diagram to a database schema and deduce it to the desired normal form. • Formulate queries in Relational Algebra, Structured Query Language (SQL) for database manipulation. • Explain the transaction processing and concurrency control techniques.

Unit No.	Course Content	Hours
UNIT I	**Introduction to Databases:** Introduction to Database Management System, File based system, Advantages of DBMS over file based system, Characteristics of the Database Approach, Actors on the Scene, Workers behind the Scene, Advantages of Using the DBMS Approach, Database Applications, Data Models, Schemas, and Instances, Three-Schema Architecture and Data Independence, Database Languages and Interfaces, Centralized and Client/Server Architectures for DBMSs, Classification of Database Management Systems	10
UNIT II	**Entity-Relationship (ER) Model:** Using High-Level Conceptual Data Models for Database Design, Entity Types, Entity Sets, Attributes and Keys, Relationship Types, Relationship Sets, Roles and Structural Constraints, Weak Entity Types, Refining the ER Design for the COMPANY Database, ER Diagrams, Naming Conventions and Design Issues, Relationship Types of Degree Higher than Two, Conversion of E-R Diagram to Relational Database.	10
UNIT III	**Basics of Functional Dependencies and Normalization for Relational Databases:** Informal Design Guidelines for Relation Schemas, Decomposition, Functional Dependencies, Normalization, Rules of Data Normalization, The First Normal Form(1NF), The Second Normal Form(2NF), The Third Normal Form(3NF), Boyce Codd Normal Form(BCNF).	10
UNIT IV	**Relational Query Language & SQL (Structured Query Language):** Relational Operations: SELECT, PROJECT, RENAME and JOIN, Relational Algebra Operations from Set Theory, SQL Data Definition and Data Types, Specifying Constraints in SQL, Basic Retrieval Queries in SQL Data Definition Language(DDL), Data Manipulation Language (DML), Data Control Language(DCL), Transaction Control Language(TCL) Statements in SQL, Aggregate Functions, Queries using Order by, Group by & Having, Nested Queries, Joins, Views	10

UNIT V	**Transaction Processing & PL/SQL:** Introduction to Transaction Processing, Transaction and System Concepts, Desirable properties (ACID properties) of Transactions, Transactions: read & write operations, Introduction to PL/SQL, Variables, Constants, Control Statements, PL/SQL Procedure, Functions Example Programs.	08

Recommended Leaning Resources

Text Book:

1. Ramez Elmasri, Navathe, Fundaments of Database Systems – 6th Edition, Published by Pearson Edition.

Reference Books:

1. Modern Database Management: Fred R. McFadden.
2. Database Systems: Design, Implementation, and Management: C Coronel, S Morris, Peter Rob.
3. SQL, Pl/SQL: The Programming Language of Oracle: Ivan Bayross.

Year	II	Course Code:	Credits	02
Semester	IV	Course Title: Database Management Systems – Lab	Hours	40
Course Pre-requisites, if any		Knowledge of C Programming		
Formative Assessment Marks: 10		Summative Assessment Marks: 40		Duration of ESA: 03 hrs.

PART A:

1. Retrieving records from the table – Consider the EMPLOYEES table with the following details.

   Employee_Id, First_Name, Last_Name, Email, Phone_Number, Hire_Date, Job_Id, Salary, Commission_Pct, Manager_Id, Department_Id

   a) Create an employee"s table with the above given details
   b) Insert five records into the table employees.
   c) Display the table Employees.
   d) Find out the employee id, names, and salaries of all the employees.
   e) List out the employees who works under manager 100.
   f) Find the names of the employees who have a salary greater than or equal to 4800.
   g) List out the employees whose last name is „AUSTIN".
   h) Find the names of the employees who works in departments 60, 70 and 80.
   i) Display the unique Manager_Id from employees table

2. Exercise on updating records in table - Create Client_master with the following fields.

   ClientNo, Name, Address, City, State, Bal_due

   a) Create a client master table with the above given details
   b) Insert five records into the Client_Master.
   c) Display Client Master Table.
   d) Find the name of Clients whose balance_due >5000.
   e) Change the bal_due of ClientNO "C123" to Rs. 5100.
   f) Change the name of the table Client_master to Client12.
   g) Display the bal_due heading as "BALANCE" Client master table.

3. Rollback and Commit Commands Create Teacher table with the following fields.

   Name, DeptNo, Date of joining, DeptName, Location, Salary

   a) Create a teacher table with the above given details
   a) Insert five records.
   b) Give Increment of 25% salary for Mathematics Department.
   c) Perform Rollback command.
   d) Give Increment of 15% salary for Commerce Department.
   e) Perform commit command

4. Company Database an Enterprise wishes to maintain a database to automate its operations. Enterprise is divided into certain departments and each department consists of employees.

The following two tables describes the automation schemas Emp (empno, ename, job, mgr, hiredate, sal, comm, deptno) Dept (deptno, dname, loc)

a) Create a Emp & Dept table with the above given details.
b) Insert five records.
c) Update the employee salary by 15%, whose experience is greater than 10 years.
d) Delete the employees, who completed 30 years of service.
e) Display the manager who is having maximum number of employees working under him?
f) Create a view, which contain employee names and their manager
g) Determine the names of employee, who earn more than their managers.
h) Determine the employees, who are located at the same place.

5. Consider the Insurance database given below. The primary keys are underlined and the data types are specified.

PERSON (driver – id #: String, name: string, address: strong) CAR (Regno: string, model: string, year: int) ACCIDENT (report-number: int, accd-date: date, location: string) OWNS (driver-id #: string, Regno: string)

a) Create the above tables by properly specifying the primary keys and the foreign keys.
b) Enter at least five tuples for each relation.
c) Demonstrate how you add a new accident to the database.
d) Find the total number of people who owned cars that were involved in accidents in 2008 were involved.

PART B:

1. Write PL/SQL procedure for Factorial of a number.
2. Write PL/SQL procedure for Fibonacci series.
3. Write PL/SQL procedure for given number is Prime or not.
4. Write PL/SQL procedure for given year is leap year or not.
5. Write a PL/SQL program for leap year

Instructions:

1. Certified Journal is mandatory for every student to appear for the examination.
2. Student has to execute all programs in each part to complete the Lab course.
3. Based on practical test 10 marks of practical shall be

Year	II	Course Code:	Credits	02
Semester	IV	Course Title: Digital Marketing [OEC]	Hours	48

Course Pre-requisites, if any	• Basic Knowledge of internet and internet browsing. • Experimental and Analytical mindset.	
Formative Assessment Marks: 10	Summative Assessment Marks: 40	Duration of ESA: 02 hrs.

Course Objectives	*After completing this course satisfactorily, a student will be able to:* • Understand the fundamental concepts and principles of digital marketing. • Develop practical skills to implement various digital marketing strategies and techniques. • Analyze and evaluate the effectiveness of digital marketing campaigns. • Apply critical thinking and problem-solving skills to real-world digital marketing scenarios. • Create comprehensive digital marketing plans and strategies.

Unit No.	Course Content	Hours
UNIT I	**Introduction to Digital Marketing:** Overview of digital marketing, Evolution of digital marketing, Importance and benefits of digital marketing, Digital marketing channels and platforms. **Digital Marketing Strategy:** Developing a digital marketing strategy, Setting goals and objectives.	12
UNIT II	**Digital Marketing Planning:** Budgeting and resource allocation Campaign planning and execution, Monitoring and adjusting digital marketing campaigns. **Search Engine Optimization (SEO):** Introduction to SEO, Keyword research and analysis, On-page optimization techniques, Off-page optimization techniques, SEO measurement and analytics.	12
UNIT III	**Social Media Marketing:** Overview of social media marketing, Social media platforms and their features, Creating and optimizing social media profiles, Social media content strategy, Social media advertising and analytics **Email Marketing:** Introduction to email marketing, Building an email list Creating effective email campaigns, Email automation and segmentation Email marketing metrics and analytics.	12
UNIT IV	**Content Marketing:** Understanding content marketing, Content strategy and planning, Content creation and distribution, Content promotion and amplification, Content marketing metrics and analytics.	12

Recommended Leaning Resources

Text Book:

1. "Search Engine Optimization All-in-One For Dummies" by Bruce Clay
2. "Email Marketing Rules: How to Wear a White Hat, Shoot Straight, and Win Hearts" by ChadS. White
3. "Digital Marketing Strategy: An Integrated Approach to Online Marketing" by Simon Kingsnorth
4. "Mobile Marketing: How Mobile Technology is Revolutionizing Marketing, Communications and Advertising" by Daniel Rowles

Reference Books:

1. "Web Design with HTML, CSS, JavaScript and jQuery Set" by Jon Duckett
2. "Advanced Google AdWords" by Brad Geddes
3. "Social Media Marketing Workbook: How to Use Social Media for Business" by Jason McDonald

SEC for IV Semester

Year	II	Course Code:	Credits	02
Semester	III	Course Title: Office Automation [SEC]	Hours	48
Course Pre-requisites, if any		• Basic Knowledge of Computer, internet and internet browsing. • Experimental and Analytical mindset.		
Formative Assessment Marks: 10		Summative Assessment Marks: 40		Duration of ESA: 02 hrs.

Course Objectives	*After completing this course satisfactorily, a student will be able to:* • Understand the fundamental concepts and principles of Computer. • Develop practical skills to implement various applications strategies and techniques. • Analyze and evaluate the effectiveness of Office tools. • Apply critical thinking and problem-solving skills

Unit No.	Course Content	Hours
UNIT I	**MS-Word:** Creating, Editing, Saving and printing text documents - Font and Paragraph formatting - Simple character formatting - Inserting tables, Smart art, Page breaks - Using lists and styles - Working with images - Using Spelling and Grammar check - Understanding document properties - Mail merge.	12
UNIT II	**MS- Excel:** Spreadsheet Basics - Creating, editing, saving and printing spreadsheet - Working with functions & formulas - Modifying worksheets with color & auto formats - Graphically representing data: Charts & Graphs - Speeding data entry: Using Data Forms - Analyzing Data: Data Menu, Subtotal, Filtering Data - Formatting work-sheets - Securing & Protecting Spreadsheets.	12
UNIT III	**MS-PowerPoint:** Opening, Viewing, Creating and Printing slides - Applying auto layouts - Adding custom animation - Using slide transitions - Graphically representing data: Charts & Graphs - Creating Professional Slide for Presentation.	12
UNIT IV	**Collaborative Tools:** Email: Compose and send emails- organize their inbox - manage attachments and use email filters and rules. Forms: Create a Form-Validate a Form; Share a Form-Managing Response. Online Data Management: Online Quiz-Online Forms-Online Assignment-Google sheets- Google docs-Google slides-shared calendars and document sharing services. online meeting platforms-Video-Conferencing / online Meet-social media tools and platforms to communicate and collaborate with others.	12
Recommended Leaning Resources		

Text Book:

1. Dinesh Maidasani, Learning computer Fundamentals, MS Office and Internet & Web Technology, Firewall Media, Third Edition 2016.
2. https://wiki.openoffice.org/wiki/Documentation.
3. http://windows.microsoft.com/en-in/windows/windows-basics-all-topics.