

Deccan Education Society's

Kirti M. Doongursee College of Arts, Science and Commerce (AUTONOMOUS)



Affiliated to

UNIVERSITY OF MUMBAI

Syllabus for

Program: Bachelor of Science

Course: T.Y.B.SC.

Subject: Computer Programming and System
Analysis
(Applied Component)

Choice Based Credit System (CBCS)
with effect from
Academic Year 2024-2025

Course Code	SEM – V - Computer Programming and System Analysis-I	Credits	Lectures/Week
KUSMAT24505	Paper V	2	3
Course Outcomes: After successful completion of this course, students would be able to - Define database and its languages, SQL commands and functions, fundamentals of PL/SQL and java. - Explain commands and functions of SQL, PL/SQL and java. - Apply various clauses, conditional statements, looping statement to write different programs of SQL, PL/SQL and java. - Examine various methods, control statements, data types and functions of SQL, PL/SQL and java.			
Unit	Topics	No of Lectures	
I	RELATIONAL DATA BASE MANAGEMENT SYSTEM 1. Introduction to Data base Concepts: Database, Overview of data base management system. Data base Languages- Data Definition Languages (DDL) and Data Manipulation Languages (DML). 2. Entity Relation Model : Entity, attributes, keys, relations, Designing ER diagram, integrity Constraints over relations, conversion of ER to relations with and without constraints. 3. SQL Commands and functions a) Creating and altering tables: CREATE statement with constraints like KEY, CHECK, DEFAULT, ALTER and DROP statement. b) Handling data using SQL: selecting data using SELECT statement, FROM clause, WHERE clause, HAVING clause, ORDERBY, GROUP BY, DISTINCT and ALL predicates, Adding data with INSERT statement, changing data with UPDATE statement, removing data with DELETE statement. c) Functions: Aggregate functions- AVG, SUM, MIN, MAX and COUNT, Date functions- ADD_MONTHS(), CURRENT_DATE(), LAST_DAY(), MONTHS_BETWEEN(), NEXT_DAY(). String functions- LOWER(), UPPER(), LTRIM(), RTRIM(), TRIM(), INSERT(), RIGHT(), LEFT(), LENGTH(), SUBSTR(). Numeric functions: ABS(), EXP(), LOG(), SQRT(), POWER(), SIGN(), ROUND(number). d) Joining tables: Inner, outer and cross joins, union.	15	
II	INTRODUCTION TO PL/SQL 1. Fundamentals of PL/SQL: Defining variables and constants, PL/SQL expressions and comparisons: Logical	15	

	Operators, Boolean Expressions, CASE Expressions Handling, Null Values in Comparisons and Conditional Statements, 2. PL/SQL Data Types: Number Types, Character Types, Boolean Type. Date time and Interval types. 3. Overview of PL/SQL Control Structures: Conditional Control: IF and CASE Statements, IF-THEN Statement, IF-THEN-ELSE Statement, IF-THEN-ELSIF Statement, CASE Statement, 4. Iterative Control: LOOP and EXIT Statements, WHILE-LOOP, FOR-LOOP, Sequential Control: GOTO and NULL Statements.	
III	INTRODUCTION TO JAVA PROGRAMMING 1. Object-Oriented approach: Features of object-orientations: Abstraction, Inheritance, Encapsulation and Polymorphism. 2. Introduction: History of Java features, different types of Java programs, Differentiate Java with C. Java Virtual Machine. 3. Java Basics: Variables and data types, declaring variables, literals numeric, Boolean, character and string literals, keywords, type conversion and casting. Standard default values. Java Operators, Loops and Controls 4. Classes: Defining a class, creating instance and class members: creating object of a class, accessing instance variables of a class, creating method, naming method of a class, accessing method of a class, overloading method, 'this' keyword, constructor and Finalizer: Basic Constructor, parameterized constructor, calling another constructor, finalize() method, overloading constructor. 5. Arrays: one and two – dimensional array, declaring array variables, creating array objects, accessing array elements. 6. Access control: public access, friendly access, protected access, private access.	15
IV	Inheritance, Exception Handling a) Inheritance: Various types of inheritance, super and sub classes, keywords- 'extends', 'super', over riding method, final and abstract class: final variables and methods, final classes, abstract methods and classes. Concepts of inter face. b) Exception Handling and Packages: Need for Exceptional Handling, Exception Handling techniques: try and catch, multiple catch statements, finally block, use of throw and throws. Concept of packages. Inter class method: parseInt().	15
Textbooks: • Data base management system, RamKrishnam, Gehrke, McGraw-Hill • Ivan Bayross, "SQL, PL/SQL – The Programming languages of Oracle" B.P.B. Publications, 3rd Revised Edition. • George Koch and Kevin Loney, ORACLE "The complete Reference", Tata McGraw Hill, New Delhi. • Elsmasri and Navathe, "Fundamentals of Database Systems" Pearson Education. • Peter Roband Coronel, "Database System, Design, Implementation and Management", Thomson Learning.		

- C.J. Date, Longman, “Introduction database system”, Pearson Education.
- Jeffrey D. Ullman, Jennifer Widsom, “A First Course in Database Systems”, Pearson Education.
- Martin Gruber, “Understanding SQL”, B.P.B. Publications.
- Programming with Java: a Primer 4th Edition by E. Balagurusamy, Tata McGraw Hill
- Java the complete Reference, 8th Edition, Herbert Schildt, Tata McGraw Hill.
- Michael Abbey, Micheal. Corey, Ian Abramson, Oracle8i- A Beginner’s Guide, Tata McGraw-Hill.

Additional References:

- Eric Jend rock, Jennifer Ball, D Carson and others, The Java EE5 Tutorial, Pearson Education, Third Edition 2003.
- Ivan Bayross, Web Enabled Commercial Applications Development using Java 2, BPB Publications. Revised Edition, 2006.
- Joe Wiggles worth and Paula Mc Millan, Java Programming: Advanced Topics, Thomson Course Technology (SPPD), Third Edition 2004.

Course Code	SEM – VI - Computer Programming and System Analysis-II	Credits	Lectures/ Week
KUSMAT24605	Paper V	2	3
Course Outcomes: After successful completion of this course, students would be able to • Define fundamentals of java and python. • Explain commands, functions, data types of java and python. • Apply various clauses, conditional statements, looping statement to write different programs of java and python. • Examine various methods , control statements, data types, functions of java and python.			
Unit	Topics	No of Lectures	
I	JAVA APPLETs AND GRAPHICS PROGRAMMING 1. Applets: Difference of applet and application, creating applets, applet life cycle, passing parameters to applets. 2. Graphics, Fonts and Color: The graphics class, painting, repainting and updating an applet, sizing graphics. Font class, draw graphical figures-lines and rectangle, circle and ellipse, drawing arcs, drawing polygons. Working with Colors: Color methods, setting the paint mode. 3. AWT package: Containers: Frame and Dialog classes, Components: Label; Button; Checkbox; Text Field, Text Area.	15	
II	PYTHON 3.x 1. Introduction: The Python Programming Language, History, features, Installing Python. Running Code in the Interactive Shell, IDLE. Input, Processing, and Output , Editing, Saving, and Running a Script, Debugging : Syntax Errors, Runtime Errors, Semantic Errors, Experimental Debugging. 2. Data types and expressions: Variables and the Assignment Statement , Program Comments and Doc strings . Data Types-Numeric integers & Floating-point numbers. Boolean, string. Mathematical operators +, -, *, **, %. PEMDAS. Arithmetic expressions, Mixed-Mode Arithmetic and type Conversion, type(). Input(), print(), program comments. id(), int(), str(), float(). 3. Loops and selection statements: Definite Iteration: The for Loop, Executing statements a given number of times , Specifying the steps using range() , Loops that count down, Boolean and Comparison operators and Expressions, Conditional and alternative statements-Chained and Nested Conditionals: if, if-else, if-elif-else, nested if, nested if-else. Compound Boolean Expressions , Conditional Iteration: The while Loop –with True condition, the break Statement. Random Numbers. Loop Logic, errors, and testing	15	

III	STRINGS, LIST AND DICTIONARIES. 1. Strings, Lists, Tuple, Dictionary: Accessing characters, indexing, slicing, replacing. Concatenation (+), Repetition (*).Searching a substring with the 'in' Operator, Traversing string using while and for. String methods- find, join, split, lower, upper. len(). 2. Lists – Accessing and slicing, Basic Operations (Comparison, +),List membership and for loop. Replacing element (list is mutable). List methods- append, extend, insert, pop, sort. Max(), min(). Tuples. 3. Dictionaries-Creating a Dictionary, Adding keys and replacing Values , dictionary - key(), value(), get(), pop() , Traversing a Dictionary. Math module: sin(), cos(),exp(), sqrt(), constants- pi, e. 4. Design with functions : Defining Simple Functions- Parameters and Arguments, the return Statement, tuple as return value. Boolean Functions. Defining a main function. Defining and tracing recursive functions. 5. Exception handling: try- except.	15
IV	DOING MATH WITH PYTHON 1. Working with Numbers: Calculating the Factors of an Integer, Generating Multiplication Tables , converting units of Measurement ,Finding the roots of a Quadratic Equation 2. Algebra and Symbolic Math with SymPy: symbolic math using the SymPy library. Defining Symbols and Symbolic Operations, factorizing and expanding expressions, Substituting in Values, Converting strings to mathematical expressions. Solving equations, Solving Quadratic equations, Solving for one variable in terms of others, Solving a system of linear equations, Plotting using SymPy , Plotting expressions input by the user, Plotting multiple functions .	15
Textbooks: • Programming with Java:A Primer 4 th Edition by E.Balagurusamy, Tata McGraw Hill. • Java The Complete Reference, 8th Edition, Herbert Schildt, Tata McGraw Hill. • Fundamentals of Python First programs 2nd edition - Kenneth A Lambert, Cengage Learning India. • Doing Math with Python - Amit Saha, No starch ptress, Additional References: • Eric Jendrock, Jennifer Ball, DCarsonandothers,The Java EE5 Tutorial, Pearson Education, Third Edition, 2003. • Ivan Bay Ross, Web Enabled Commercial Applications Development UsingJava2, BPB Publications, Revised Edition, 2006 • Joe Wigglesworth and Paula McMillan, Java Programming: Advanced Topics, Thomson Course Technology(SPD),ThirdEdition,2004 • The Java Tutorials of Sun Microsystems Inc. http://docs.oracle.com/javase/tutorial. • Problem solving and Python programming- E. Balgurusamy, TataMcGrawHill.		

Course Code	SEM V - Computer Programming and System Analysis-I	Credits	Lectures/ Week
KUMAT24P	Practical	1	3
Course Outcomes: After successful completion of this course, students would be able to - Analyze and solve the problems based on the syllabus. - Relate mathematics and its applications in computer programming.			
1	Creating a single table with/without constraints and executing queries. Queries containing aggregate, string and date functions fired on a single table.		
2	Updating tables, altering table structure and deleting table Creating and altering a single table and executing queries. Joining tables and processing queries.		
3	Writing PL/SQL Blocks with basic programming constructs.		
4	Writing PL/SQL Blocks with control structures.		
5	Write a Java program to create a Java class: (a) without instance variables and methods, (b) with instance variables and without methods, (c) without instance variables and with methods. (d) with instance variables and methods.		
6	Write a Java program that illustrates the concepts of one, two dimension arrays.		
7	Write a Java program that illustrates the concepts of Java class that includes (a) construct or with and without parameters (b) Over loading methods.		
8	Write a Java program to demonstrate inheritance by creating suitable classes.		
9	Write a program that illustrates the error handling using exception handling.		

Course Code	SEM VI - Computer Programming and System Analysis-II	Credits	Lectures/ Week
KUMAT24P	Practical	1	3
Course Outcomes: After successful completion of this course, students would be able to - Analyze and solve the problems based on the syllabus. - Relate mathematics and its applications in computer programming.			
1	Write a program that demonstrates the use of input from the user using parseInt().		
2	Write a Java applet to demonstrate graphics, Font and Color classes.		
3	Write a Java program to illustrate AWT package.		
4	Preparing investment report by calculating compound interest, computing approximate value of by using the $\frac{\pi}{4} = 1 - \frac{1}{3} + \frac{1}{5} - \frac{1}{7} + \dots$ (Gottfried Leibniz)		
5	Convert decimal to binary, octal using string, Write the encrypted text of each of the following words using a Caesar cipher with a distance value of 3.		
6	Hexadecimal to binary using dictionary, finding median of list of numbers.		
7	Enhanced Multiplication Table Generator, Unit Converter, Fraction Calculator .		
8	Factor Finder, Graphical Equation Solver.		
9	Summing a Series, Solving Single-Variable Inequalities.		

Evaluation Scheme for Second Year (UG) under AUTONOMY

I. Internal Evaluation for Theory Courses – 40 Marks

- (i) Continuous Internal Assessment 1 (Assignment-Tutorial) – 20 Marks
- (ii) Continuous Internal Assessment 2 – 20 Marks (Class Test with Fill in the Blanks, True or False & Answer the following)

II. External Evaluation for Theory Courses – 60 Marks

Duration: 2 Hours

Theory question paper pattern:

All questions are compulsory.

Qn.	Based on	Type	Options	Marks
Q.1	Unit I, II ,III & IV	Objective MCQs	<i>Attempt all 6</i>	12
Q.2	Unit I	Descriptive	<i>Any 2 out of 4</i>	12
Q.3	Unit II	Descriptive	<i>Any 2 out of 4</i>	12
Q.4	Unit III	Descriptive	<i>Any 2 out of 4</i>	12
Q.5	Unit IV	Descriptive	<i>Any 3 out of 6</i>	12

- All questions shall be compulsory with internal choice within the questions.
- Each Question may be sub-divided into sub questions as a, b, c, d, etc. & the allocation of Marks depends on the weightage of the topic.

III. Practical Examination

- 100 Marks (60 marks External + 40 marks Internal)

Sr. No.	Undergraduate Practical Internal Evaluation:	Marks
1	Short Experiment	30
2	Viva	10

Sr. No.	Undergraduate Practical External Evaluation:	Marks
1	Laboratory work/ Experiments	50
2	Journal	10

- Duration:
Internal Practical : 1 Hour.
External Practical : 2 Hours.
- Minimum 80% practical from the subject are required to be completed.
- Certified Journal is necessary for appearing at the time of Practical Exam.

PASSING STANDARD AUTONOMY Third Year:

- The learners /students shall obtain minimum of 40% marks in the Internal Assessment and External Assessment (Semester End Examination) COMBINED, to pass the course in a particular semester. A learner / student will be said to have passed the course if He/She passes the Internal Assessment + Semester End Examination COMBINED.
- To pass the examination, attendance is compulsory in both internal and external (theory plus practical) examination.

NOTE:

- The students are required to present a duly certified journal for appearing at the practical examination, failing which they will not be allowed to appear for the examination.
- In case of loss of Journal and/ or Report, a Lost Certificate should be obtained from Head of the
- Department/ Co-ordinator of the department ; failing which the student will not be allowed to appear for the practical examination.

- The passing standards is 40% for external and internal component (24 out of 60 for external and 16 out of 40 for internal).