



AC/04.08.2018/RS1

**SIES College of Arts, Science and
Commerce
(Autonomous)
Affiliated to Mumbai University**

Syllabus under Autonomy - June 2018

**Program: T.Y. B.Sc.
Course: APPLIED COMPONENT
Computer Programming and Applications**

Choice Based Credit System CBCS

with effect from the academic year 2018-19

Broad Objectives:-

The course divided into two semesters, has the following goals for its learners:-

1. To have database management system and SQL commands along with PL/SQL Using Oracle thereby giving the student mastery on an open source based toolkit which has more scope in the job market.
2. The retention of “Introduction to C Programming “ in Semester V is based on the fact that C still has the charm to be the first programming language to be taught.
3. In Sem VI, “Introduction to Java Programming” is done through the framework of object oriented systems. Applets and Graphics programming give the learner an engaging and interesting treat.
4. Students will also be exposed to Python Programming in Sem VI since it has gained importance than other programming languages and holds a lot of promise for developers. Apart from being an open source programming language, it is also one of the most versatile programming languages.

SEMESTER V				
THEORY				
Course Code	UNIT	TOPICS	Credits	L or P/Week
SIUSCPA51	I	Introduction to C Programming	2	4L
	II	Functions, Pointers and Structures		
	III	Relational Database Management System		
	IV	Introduction to PL/SQL		
PRACTICALS				
SIUSCPAP5	Practicals based on SIUSCPA51		2	2P(1P=2L) per batch

Course Objectives:-[Sem V]

On successful completion of this course students should be able to:

- Write C programs using loops, conditionals, switch, break and continue statements.
- Handle one and two dimensional arrays
- Understand the concept of functional hierarchical code
- Handle pointers and structures
- Create database tables with and without constraints
- Update and alter table structures
- Retrieve data from single or multiple tables
- Process data with date, string and aggregate functions
- Write simple PL/SQL block codes with and without loops.

Teaching Pattern:-

Theory:-4 lectures per week

Practical:-2 practicals each of 2 lecture periods per week per batch. Two lecture periods of the practicals shall be conducted in succession together on a single day.

SEMESTER V	
Course code SIUSCPA51	Course Title Computer Programming and Applications
Unit I	<p>Introduction to C Programming (15 L)</p> <p>(a) Structure of C program: Header and body, Concept of header files, Use of comments, Compilation of a program.</p> <p>(b) Data Concepts: Variables, Constants, data types like: int, float char, double and void. Qualifiers: short and long size qualifiers, signed and unsigned qualifiers. Declaring variables, Scope of the variables according to block, Hierarchy of data types.</p> <p>(c) Types of operators: Arithmetic, Relational, Logical, Compound Assignment, Increment and decrement, Conditional or ternary operators. Precedence and order of evaluation. Statements and Expressions.</p> <p>(d) Mathematical functions : sin(), cos(), tan(), exp(), ceil(), floor(), log(), log10(), pow(), sqrt().</p> <p>(e) Type conversions: Automatic and Explicit type conversion.</p> <p>(f) Data Input and Output functions: Formatted I/O: printf(), scanf(). Character I/O format: getch(), getche(), getchar(), getc(), gets(), putchar(), putc(), puts().</p> <p>(g) Arrays: (One and two dimensional), declaring array variables, initialization of arrays, accessing array elements.</p> <p>(h) Strings: Declaring and initializing String variables, Character and string handling functions (strcpy, strcat, strchr, strcmp, strlen, strstr).</p> <p>(i) Iterations: Control statements for decision making: (a) Branching: if statement, if..else statement , else.. if statement, nested if statement, switch statement. (b) Looping: while loop, do while, for loop, nested loop. (c) Loop interruption statements: break, continue.</p>
Unit II	<p>Functions, Pointers and Structures (15 L)</p> <p>(a) Functions: Global and local variables, Function definition, return statement, calling a function.</p> <p>(b) Recursion: Definition, Recursion functions for factorial, Fibonacci sequence, exponential function, G.C.D.</p> <p>(c) Storage classes: Automatic variables, External variables, Static variables, Register variables.</p> <p>(d) Pointer: Fundamentals, Pointer variables, Referencing and de-referencing, Pointer Arithmetic, Pointers and Arrays, Array of Pointers, Pointers as function arguments.</p> <p>(e) Structure: Declaration of structure, reading and assignment of structure variables, Array of structures.</p>
Unit III	<p>Relational Database Management System (15L)</p>

- (a) **Introduction to Database Concepts:** Database, Overview of database management system. Three levels of Architecture, Database design, Logical and physical data independence, DBMS Models, Database Languages- Data Definition Language (DDL) and Data Manipulation Languages (DML).
- (b) **Entity Relationship Model:** Entity, entity sets, attributes, mapping cardinalities, keys, relations, Designing ER diagram, integrity constraints over relations, Conversion of ER to relations with and without constraints.
- (c) **SQL commands and Functions:**
 - (i) **Creating and altering tables:** CREATE statement with constraints like KEY, CHECK, DEFAULT, ALTER and DROP statement.
 - (ii) **Handling data using SQL:** selecting data using SELECT statement, FROM clause, WHERE clause, IN, BETWEEN, LIKE, HAVING clause, ORDER BY, GROUP BY, DISTINCT and ALL predicates, Adding data with INSERT statement, changing data with UPDATE statement, removing data with DELETE statement.
 - (iii) **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(), INSTR(), RIGHT(), LEFT(), LENGTH(), SUBSTR(). Numeric functions: ABS(), EXP(), LOG(), SQRT(), POWER(), SIGN(), ROUND(number).
 - (iv) **Joining tables:** Inner, outer, full and cross joins, union.

Unit IV

Introduction to PL/SQL (15L)

- (a) **Fundamentals of PL/SQL:** Defining variables and constants, PL/SQL expressions and comparisons: Logical Operators, Boolean Expressions, CASE Expressions Handling, Null values in Comparisons and Conditional Statements.
- (b) **PL/SQL data types:**-Number types, Character types, Boolean type, datetime and interval types.
- (c) **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.
- (d) **Iterative Control:** LOOP and EXIT Statements, WHILE LOOP, FOR LOOP, Sequential control: GOTO and NULL Statements.

**Course
code**

SIUSCPAP5

Topics for Practical

1. Write a C program that illustrates the concepts of C operators, mathematical functions and iterations.
2. Write a C program that illustrates the concepts of arrays and strings.
3. Write a C program that illustrates the concepts of functions, recursion and storage classes.
4. Write a C program that illustrates the concepts of pointers and structures.
5. Creating, altering and updating a single table with/ without constraints and executing queries.
6. Joining tables and processing queries. Queries containing aggregate, string and date functions fired on a single table.
7. Writing PL/SQL Blocks with basic programming constructs.
8. Writing PL/SQL blocks with control structures

References:

(a) E Balagurusamy,(2004) *Programming in ANSI C (Third Edition)* :TMH

(b)George Koch and Kevin Loney (2002),*ORACLE —The Complete Reference*||, Tata McGraw Hill,New Delhi.

(c)Ivan Bayross, (2012) —*SQL,PL/SQL -The Programming language of Oracle*||,B.P.B.Publications, 3rd Revised Edition.

(d) Ramakrishnam, Gehrke, (2003)*Database Management Systems*, McGraw-Hill.

(e)YashwantKanetkar, (2010)*Let us C*: BPB

SEMESTER VI				
THEORY				
Course Code	UNIT	TOPICS	Credits	L or P /Week
SIUSCPA52	I	Introduction to Java Programming	2	4L
	II	Inheritance, Exception Handling		
	III	Java Applets and Graphics Programming		
	IV	Python 3x		
PRACTICALS				
SIUSCPAP6	Practicals based on SIUSCPA52		2	2P(1P=2L) per batch

Course Objectives:-[Sem VI]

On successful completion of this course students should be able to:

- Write programs in java with and without instance variables and methods
- Understand the concept of arrays, constructors and Overloading methods
- Understand error handling using exceptions and inheritance by creating suitable classes
- Write java applets to demonstrate graphics, Font and color classes
- Master the fundamentals of writing Python scripts
- Learn core Python scripting elements such as variables and flow control structures

Teaching Pattern:-

Theory:-4 lectures per week

Practical:2 practicals each of 2 lecture periods per week per batch. Two lecture periods of the practicals shall be conducted in succession together on a single day.

Course code SIUSCPA52	SEMESTER VI	
	Course Title Computer Programming and Applications	

Unit I Introduction to Java Programming (15 L)

- (a) **Object-Oriented approach:** Features of object-orientations: Abstraction, Inheritance, Encapsulation and Polymorphism.
- (b) **Introduction:** History of Java, Java features, different types of Java programs, Differentiate Java with C. Java Virtual Machine.
- (c) **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. No Questions are to be asked on this topic.
- (d) **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.
- (e) **Arrays:** one and two-dimensional array, declaring array variables, creating array objects, accessing array elements.
- (f) **Access control:** public access, friendly access, protected access, private access.

Unit II Inheritance, Exception Handling (15 L)

- (a) **Inheritance:** Various types of inheritance, super and subclasses, keywords-extends; 'super', overriding method, final and abstract class: final variables and methods; final classes, abstract methods and classes. Concept of interface.
- (b) **Exception Handling and Packages:** Need for Exception Handling, Exception Handling techniques: try and catch; multiple catch statements; finally block; usage of throw and throws. Concept of packages. Inter class method: parseInt().

Unit III Java Applets and Graphics Programming (15 L)

- (a) **Applets:** Difference of applet and application, creating applets, applet life cycle, passing parameters to applets.
- (b) **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.

(c) AWT package: Containers: Frame and Dialog classes, Components: Label; Button; Checkbox; TextField, TextArea.

Unit IV PYTHON 3.x (15 L)

(a) 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.

(b) Data types and expressions: Variables and the assignment statement, Program Comments and Docstrings, Data types:- Numeric integers and 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().

(c) 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.

(d) Strings: Assessing 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()

Course code	Topics for Practical
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SIUSCPAP6

- 0. Programs that illustrate the concept of selection statements, loops, nested loops, breaking out of loop.
- 1. Programs that illustrate the concept of arrays (one and two dimensional).
- 2. Programs to create a Java class
 - (i) Without instance variables and methods
 - (ii) with instance variables and without methods
 - (iii) without instance variables and with methods
 - (iv) with instance variables and with methodsCreate an object of this class that will invoke the instance variables and methods accordingly.
- 4. Programs to illustrate the concept of Java class that includes constructor with and without

parameters.

5. Programs to illustrate the concept of Java class that includes overloading methods and inheritance.
6. Programs that illustrate error handling using exception handling.
7. Java applets to demonstrate graphics, Font, Color classes and AWT package.
8. Python programs to convert decimal to binary,octal using string.

References:

- (1) E. Balagurusamy(2009), *Programming with Java: A Primer 4th Edition* by Tata McGraw Hill.
- (2) E. Balagurusamy(2017), *Problem Solving and Python Programming* by Tata McGraw Hill.
- (3) Herbert Schildt,(2013) *Java The Complete Reference, 8th Edition*, Tata McGraw Hill
- (4) Ivan Bayross,(2006),*Web Enabled Commercial Applications Development Using Java 2*,BPB Publications, Revised Edition
- (5) Kenneth A Lambert chapters 1,2 and 3.(2018) *Fundamentals of Python First Programs 2nd edition*

Internal Assessment of Theory Core Courses Per Semester Per Course (Total 40 marks)

- (a) One Assignment/Project 10 Marks.
- (b) One Class Test:20 Marks.
- (c) Active participation in class instructional deliveries05 Marks.
- (d) Overall conduct as a responsible student, mannerism etc:05 Marks.

Semester End Theory Examination (Total 60 marks)

Theory: At the end of the semester, examination of two and half hours duration and 60 marks based on the four units shall be held for each course.

Pattern of Theory question paper at the end of the semester for each course: There shall be Four compulsory Questions of 15 marks each with internal option. Question 1 based on Unit I, Question 2 based on Unit II, Question 3 based on Unit III and Question 4 based on Unit IV

Semester End Practical Examination (Total 100 marks)

Semester V and Semester VI: Total evaluation is as follows:-

- 1) Semester end Practical exam on computer- 80 marks
- 2) Viva 10 marks
- 3) Certified Journal 10 marks

Pattern of Practical question paper:-

1. There shall be four compulsory questions of twenty marks each for the semester end practical examination on computer.
2. The questions to be asked in the practical examination shall be from the list of practical experiments mentioned in the practical topics. A few simple modifications may be expected during the examination.
3. The semester end practical examination on the machine will be of THREE hours.
4. Students should carry a certified journal with minimum of 06 practicals (mentioned in the practical topics) at the time of examination.
5. Number of students per batch for the regular practical should not exceed 20. Not more than two students are allowed to do practical experiment on one computer at a time.
