Rayat Shikshan Sanstha's

SADGURU GADAGE MAHARAJ COLLEGE, KARAD.

(An Empowered autonomous College)

Accredited By NAAC with 'A+ (3.63 CGPA)'

Grade ISO- 9001-2015 Certified

Affiliated to Shivaji University, Kolhapur

Bachelor of Computer Science

DEPARTMENT OF COMPUTER SCIENCE (OPTIONAL)

Under the Faculty of Science and Technology Choice Based Credit System (CBCS)

Regulations in accordance with **National Education Policy** to be implemented from Academic Year 2024-25

Syllabus For

B.Sc. Part – I

SEMESTER I & II

(Syllabus to be implemented from June 2024)

B.Sc. Computer Science (Optional) Semester - I & II
(CBCS) NEP-2020 Syllabus to be implemented from June 2024 Onwards

1. **TITLE:** Computer Science
2. **YEAR OF IMPLEMENTATION**: Revised Syllabus will be implemented from June2024 onwards.
3. **DURATION:** B.Sc. in Computer Science Part - I The duration of the course shall be one year and two semesters.
4. **PATTERN:** The pattern of examination will be semester.
5. **STRUCTURE OF COURSE:**

STRUCTURE OF COURSE

Sr. No.	Paper	Name of Paper	Marks		
			Theory	Internal	Total
Computer Science (Semester - I)					
1	BCST24-101	Problem Solving Using Computers-I	40	10	50
2	BCST24-102	Database Management System-I	40	10	50
3	BCSP24-103	Computer Science Practical Based on Paper BCST24-101 and BCST-24-102	--	--	50
4	OEBCS24-101	Basic of Computer	40	10	50
5	IKS-I	History of IKS	50	--	50
Total					150
Computer Science (Semester - IV)					
6	BCST24-201	Problem Solving Using Computers-II	40	10	50
7	BCST24-202	Database Management System-II	40	10	50
8	BCSP24-203	Computer Science Practical Based on Paper BCST24-201 and BCST-24-202	--	--	50
9	OEBCS24-201	Operating System	40	10	50
10	VEC-I	DECC	50	--	50
Total					150

B.Sc. Part –I Computer Science Optional (Semester– I)

Course Code: BCST24-101

Course Title: Problem Solving Using Computers-I

Total Contact Hours: 36 Hrs. (36 Lectures of 60 Min.)

Teaching Scheme: Theory – 02 Lect. / Week

Credits: 02 **Total Marks: 40**

Unit I: Introduction to Programming Languages: **Hours Allotted: 10**

Programming languages-their classification and characteristics, language translators and language translation activities Planning the Computer Program: What is program and programming paradigms Concept of problem Solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.

Techniques of Problem Solving: Algorithms, Flowcharting, Structured programming Concepts, Programming methodologies viz. top-down and bottom-up programming

Unit II: Building Blocks of Program: **Hours Allotted:10**

Data, Data Types, Data Binding, Variables, Constants, Declaration, Operations on Data such as assignment, arithmetic, relational, logical or Boolean, ternary, bitwise, increment or decrement operators.

Introduction to Python Programming**:** Features, Structure of a Python Program (Python Shell Indentations, Comments), Python Interpreter, Writing and executing simple program, Basic Data Types: numbers (int, long, float, complex), strings, Declaring variables, Performing assignments, arithmetic operations, Sequence Control – Precedence of operators, Type conversion, Simple input-output (print(), raw_input(), input())

Unit III: Conditional Statements and Looping Statements: **Hours Allotted:16**

Conditional Statements-if, if-else, nested if –else

Looping: for, while, nested loops, else clause with while and for loop

Control statements: Terminatingloops, skipping specific conditions

(break, continue, pass) Numeric Functions: abs(), ceil(), floor(), max(), min(), pow(), sqrt() String Manipulation: Declaring strings, String immutability unicode string (u'String'), escape sequences (\), Operations on String (Concatenation (+), Repetition (*), Slicing ([index]) Range Slicing([start: end] or [:end] or [start:] , Member ship operator (in, not in)), String Functions : capitalize(), len() lower(), swapcase(), upper()

B.Sc. Part –I Computer Science Optional (Semester– I)

Course Code: BCST24-102

Course Title: Database Management System-I

Total Contact Hours: 36Hrs. (36 Lectures of 60 Min.)

Teaching Scheme: Theory – 02 Lect. / Week

Credits: 02 **Total Marks: 40**

Unit I Introduction to DBMS: **Hours Allotted: 10**

Introduction of DBMS – Database, DBMS – Definition, Overview of DBMS, File processing system vs DBMS, Limitation of file processing system, Advantages of DBMS, Levels of abstraction, Data independence, DBMS Architecture, Users of DBMS,

Data models - Object Based Logical Model, Record Based Logical Model (relational, hierarchical, network)

Unit II Entity Relationship Model: **Hours Allotted: 10**

Entities, attributes, entity sets, relations, relationship sets, Additional constraints (key constraints, participation constraints, weak entities, aggregation / generalization, Conceptual Design using ER (entities VS attributes, Entity Vs relationship, binary Vs ternary, constraints beyond ER), Entity Relationship Diagram (ERD)

Unit III MySQL: **Hours Allotted: 16**

DDL Statements - Creating Databases, Using Databases, MySQL datatypes, Creating Tables (with integrity constraints – primary key, default, check, not null), Altering Tables, Renaming Tables, Dropping Tables, Truncating Tables, Backing Up and Restoring databases

DML Statements – Viewing the structure of a table insert, update, delete, select – all columns, specific columns, unique records, conditional select, in clause, between clause, limit, aggregate functions (count, min, max, avg, sum), group by clause, having clause.

Functions – String Functions (concat, instr, left, right, mid, length, lcase/lower, ucase/upper, replace, strcmp, trim, ltrim, rtrim), Math Functions (abs, ceil, floor, mod, pow, sqrt, round, truncate) Date Functions (adddate, datediff, day, month, year, hour, min, sec, now, reverse)

DCL Statements (creating/dropping users, privileges introduction, granting/revoking privileges, viewing privileges)

B.Sc. Part –I Computer Science Optional (Semester– I)

Course Code: BCSP24-103

Course Title: BCSP24- 103 Practical's based on BCST24-101 & BCST24-102

Teaching Scheme: Practical – 04 Hrs. / Week

Credits: 02 **Total Marks: 50**

Python Programming

1. Using the Operating system (logging, creating – deleting folders, Creating-deleting files, using editors etc.)
2. Installing python and setting up environment. Simple statements like printing the names, numbers, mathematical calculations, etc.
3. Simple programs containing variable declaration and arithmetic operations
4. Programs based on conditional constructs
5. Programs based on loops
6. Programs related to string manipulation

Introduction to Database Management System

Practical No. 1

- Viewing all databases
- Creating a Database
- Viewing all Tables in a Database
- Creating Tables (With and Without Constraints)
- Inserting/Updating/Deleting Records in a Table
- Saving (Commit) and Undoing (rollback)

Practical No. 2

- Altering a Table
- Dropping/Truncating/Renaming Tables
- Backing up / Restoring a Database

Practical No. 3

- Simple Queries
- SIMPLE Queries with Aggregate functions
- Queries with Aggregate functions (group by and having clause)

B.Sc. Part –I Computer Science Optional (Semester– I)

Course Code: OEBCST24-101

Course Title: Basic of Computer

Total Contact Hours: 36Hrs. (36 Lectures of 60 Min.)
Teaching Scheme: Theory – 02 Lect. / Week

Credits: 02 **Total Marks: 40**

UNIT-I: Introduction to Computers: Hours Allotted: 10

Definition of Computers, History and Generations of Computers, Characteristics of computer, Classification of Computers. Fundamental Block diagram of Computer: CPU, Input & Output Unit. Input devices, Output devices, Types of printer's, Memory, CD-ROM, Hard disk, Floppy disk.

UNIT-II: MS-Word: Hours Allotted: 10

Overview of Word Processing, Parts of word window, Types of Menus . Opening, creating saving, cut, copy and paste. print and print preview. Find and Replace, Header& Footer, save & save as, Borders and shading, Bullets & Numbering, spelling and Grammar, Word count, Mail Merge, Table handling and important shortcut keys, Macros. File Menu ,Auto Correct , Home Tab , Insert Tab , Page Layout Tab , Mailings Tab , Review Tab , View Tab.

UNIT-III: MS-Excel Hours Allotted: 10

Spreadsheets, Introduction to Excel, File Tab , Home Tab , Functions in Excel 2010, Insert Tab, Page Layout Tab, Formulas, Data Tab, Review Tab, View Tab, Charts, Conditional formatting, Data Validation, Printing.

UNIT-III: MS-PowerPoint Hours Allotted: 10

Overview of MS-PowerPoint, Ribbon, Create a new presentation, Slide Views ,Apply Transition, Presenting Slide Show ,Saving and Printing ,Word Art and Shapes ,Animating Text and Objects .

REFERENCES:

1. Microsoft Office 2007 Training Guide, BPB Publications-2010
2. Fundamentals of Computers,V Rajaraman 6th edition PHI Learning Private Limited 2014
3. Sanjay Saxena: A First Course in Computers. Vikas Publishing House.
4. Peter Norton: Computing Fundamentals. 6th Edition, McGraw Hill-Osborne,2007
5. Alexis Leon and Marthews Leon: Introduction to Computers, Leon Vikas,1999.

B.Sc. Part –I Computer Science Optional (Semester–II)

Course Code: BCST24-201

Course Title: Problem Solving using Computers-II

Total Contact Hours: 36 Hrs. (36 Lectures of 60 Min.)

Teaching Scheme: Theory – 02 Lect. / Week

Credits: 02 **Total Marks: 40**

Unit I: Lists and Tuples **Hours Allotted: 10**

Lists: Creating a list, Displaying list(print()), Basic Operation(Length (len()), Concatenation(+), Repetition(*), Membership (in, not in), Iteration (for var in list), Slicing, Updating(=) and deleting(del) element of a list. Compare (cmp()), Maximum(max()) and minimum (min())), List Methods (Append (list.append()), Count (list.count()), Insert object (list.insert()), Remove (list.remove(), list.pop()), Reverse (list.reverse()))

Tuples: (sequence of immutable objects) : Creating tuples(using () brackets) and Deleting tuple(del), empty tuple, Displaying(print()), Basic Operation(Length (len()), Concatenation(+), Repetition(*), Membership (in, not in), Iteration (for var in list), Slicing, Updating(=) and deleting(del) element of a list, Compare (cmp()), Maximum(max()) and minimum (min()))

Unit II: Dictionaries and Functions **Hours Allotted: 16**

Dictionary : Concept of dictionary, Creating Dictionary ({Key:Value,…}), Values are mutable objects but keys are immutable object, Properties of Dictionary keys, Basic Operation(Length (len()) Compare (cmp())), Dictionary Methods(Clear (dict.clear())), Existence of Key (dict.has_key()), List of dictionaries tuple pairs (dict.items()), List of keys (dict.keys()), Add dictionary (dict.update()), Dictionary Values (dict.values()))

Functions: Defining Functions (def, name, arguments, function suite, return statement), calling a function, Pass arguments by value or by reference (using list), Advantages of functions, types of functions, function parameters (required, keyword, default), anonymous functions or ternary operator(lambda), Scope of a variable (global and local)

Unit III: Modules and File Input-Output **Hours Allotted: 10**

Modules: Importing module, Creating & exploring modules, Math module, Random module, Time module, rules of locating module, namespace and scope (local and global)

Python File Input-Output: Opening and closing file, various types of file modes, reading

And writing to files

B.Sc. Part –I Computer Science Optional (Semester– II)

Course Code: BCST24-202

Course Title: Database Management System-II

Total Contact Hours: 36 Hrs. (36 Lectures of 60 Min.)
Teaching Scheme: Theory – 02 Lect. / Week

Credits: 02 **Total Marks: 40**

Unit I: Relational data model **Hours Allotted: 10**

Domains, attributes, Tuples and Relations, Relational Model Notation, Characteristics of

Relations, Relational Constraints - primary key, referential integrity, unique constraint, Null constraint, Check constraint

Unit II: ER to The Relational Model **Hours Allotted: 10**

Entity to Table, Relationship to tables with and without key constraints. Introduction to Functional Dependencies and Normalization –1NF, 2NF, 3NF. Relational Algebra Operations (selection, projection, set operations, union, intersection, difference, cross product, Joins –conditional, equi join and natural joins, division)

Unit III: MySQL Joining Tables **Hours Allotted: 18**

inner join, outer join (left outer, right outer, full outer) Subqueries – sub queries with IN, EXISTS, sub queries restrictions, Nested sub queries, ANY/ALL clause, correlated sub queries Database Protection: Security Issues, Threats to Databases, Security Mechanisms, Role of DBA, Discretionary Access Control. MySQL–Stored functions, procedures, cursor, trigger, views (creating, altering dropping, renaming and manipulating views)

Text books:

Text books:

1) Charles Dierbach, Introduction to Computer Science using Python, Wiley, 2013
2) James Payne , Beginning Python: Using Python 2.6 and Python 3, Wiley India, 2010
3) Paul Gries , Jennifer Campbell, Jason Montojo, Practical Programming: An Introduction to Computer Science Using Python 3, Pragmatic Bookshelf, 2/E 2014
4) Ramez Elmasri & Shamkant B. Navathe, Fundamentals of Database Systems, Pearson Education, Sixth Edition, 2010

B.Sc. Part –I Computer Science Optional (Semester– II)

Course Code: BCSP24-203

Course Title: BCSP24- 203 Practical's based on BCST24-201 & BCST24-202

Teaching Scheme: Practical – 02 Hrs. / Week

Credits: 02 **Total Marks: 50**

Python Programming

1. The Operating system (logging, creating – deleting folders, creating-deleting files, using editors etc.)
2. Installing python and setting up environment. Simple statements like printing the names, numbers, mathematical calculations, etc.
3. Simple programs containing variable declaration and arithmetic operations
4. Programs based on conditional constructs
5. Programs based on loops
6. Programs related to string manipulation
7. Programs related to Lists, Tuples
8. Programs related to dictionaries
9. Programs to create user defined functions.
10. Programs to read & write file

Database Management System

Practical No. 4

- Queries involving
- Date Functions
- String Functions
- Math Functions

(On previously created tables and/or the dual table)

Practical No. 5

- Creating a save point
- Commit & Roll back
- Granting and revoking permissions

Practical No. 6

- Join Queries
- Using 2 related tables
- More than 2 related tables

Practical No. 7

- Sub Queries

B.Sc. Part –I Computer Science Optional (Semester– I)

Course Code: OEBCS24-201

Course Title: Operating System

Total Contact Hours: 36Hrs. (36 Lectures of 60 Min.)
Teaching Scheme: Theory – 02 Lect. / Week

Credits: 02 **Total Marks: 40**

UNIT-I: Introduction to Operating Systems: Hours Allotted: 10

Definition, need, and functions of an OS, Abstract view of an OS and its structure (e.g., monolithic, microkernel), Operating System services and user interface, System calls and their types

UNIT-II: MS-Word: Hours Allotted: 10

Overview of Word Processing, Parts of word window, Types of Menus . Opening, creating saving, cut, copy and paste. print and print preview. Find and Replace, Header& Footer, save & save as, Borders and shading, Bullets & Numbering, spelling and Grammar, Word count, Mail Merge, Table handling and important shortcut keys, Macros. File Menu ,Auto Correct , Home Tab , Insert Tab , Page Layout Tab , Mailings Tab , Review Tab , View Tab.

UNIT-III: MS-Excel Hours Allotted: 10

Spreadsheets, Introduction to Excel, File Tab , Home Tab , Functions in Excel 2010, Insert Tab, Page Layout Tab, Formulas, Data Tab, Review Tab, View Tab, Charts, Conditional formatting, Data Validation, Printing.

UNIT-III: MS-PowerPoint Hours Allotted: 10

Overview of MS-PowerPoint, Ribbon, Create a new presentation, Slide Views ,Apply Transition, Presenting Slide Show ,Saving and Printing ,Word Art and Shapes ,Animating Text and Objects .

REFERENCES:

1. Microsoft Office 2007 Training Guide, BPB Publications-2010
2. Fundamentals of Computers,V Rajaraman 6th edition PHI Learning Private Limited 2014
3. Sanjay Saxena: A First Course in Computers. Vikas Publishing House.
4. Peter Norton: Computing Fundamentals. 6th Edition, McGraw Hill-Osborne,2007
5. Alexis Leon and Marthews Leon: Introduction to Computers, Leon Vikas,1999.

- Introduction to Operating Systems:
- Definition, need, and functions of an OS
- Abstract view of an OS and its structure (e.g., monolithic, microkernel)
- Operating System services and user interface
- System calls and their types
- Processes and Threads:
- Process concept, creation, and implementation
- Threads and their role
- Process synchronization, race conditions, and semaphores
- Process Scheduling:
- Scheduling terminology and concepts
- Preemptive and non-preemptive scheduling policies
- Deadlocks:
- What a deadlock is
- Prevention, avoidance, detection, and resolution of deadlocks
- Memory Management:
- Managing memory hierarchy
- Static and dynamic memory allocation
- File Systems:
- File system organizations on physical storage
- File and directory management in UNIX/Linux
- Unix/Linux Basics:
- Introduction to Linux and its architecture
- Basic commands for file and directory handling (e.g., ls, cat, mkdir)
- Text manipulation utilities (grep, awk, sed)
- Use of pipes and redirection for handling input/output
- Basic shell programming

B.Sc. Part –I Computer Science Optional (Semester– II)

Course Code: SECCS23-201

Course Title: HTML and CSS

Total Contact Hours: 30 Hrs. (30 Lectures of 60 Min.)
Teaching Scheme: Theory – 02Lect. / Week

Credits: 02 **Total Marks: 40**

Unit I Overview of Web Technologies: Hours Allotted: 07

Understanding the Internet and World Wide Web, Evolution of Web Technologies,Client-Server Architecture, HTML And CSS Fundamentals

Unit II Introduction to HTML5 and CSS3: Hours Allotted: 08

HTML5 and CSS3, Structure and Elements in HTML,Styling with CSS: Selectors, Box Model, and Layouts, Responsive Web Design, Media queries and viewport, Flex box and Grid Layout, Responsive Design Principles.

Unit III Responsive Web Design Skills: Hours Allotted: 07

Understanding Media Queries, Implementing Viewport Settings, Utilizing Flexbox and Grid Layouts, Creating Responsive and User-Friendly Web Interfaces, Practical Application and Projects.

Unit IV Basic JavaScript and DOM Manipulation Hours Allotted: 08

JavaScript, Basics of JavaScript: Variables, Data Types, Operators, Control Structures: Loops and Conditionals, Introduction to Functions. Document Object Model (DOM), Manipulating HTML with JavaScript, Event Handling in JavaScript, DOM Manipulation and Traversal.