

ShriAcharyaratnaDeshbhooshanShikshanPrasarakMandal's
MahavirMahavidyalaya, Kolhapur
(Autonomous)
Affiliated to Shivaji University, Kolhapur



Accredited by NAAC with 'A' Grade

Syllabus for Choice Based Credit System (NEP-2.0)
Bachelor of Science (B.Sc.) Program

Part	I	Course	Computer Science
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Under the Faculty of Science

(To be introduced from Academic Year 2025 – 26 onwards)
Subject to the revisions & modifications made from time to time)

MahavirMahavidyalaya, Kolhapur(Autonomous)
Affiliated to Shivaji University, Kolhapur

(New syllabus under Autonomy to be introduced from June, 2021 onwards)

Primary Information:			
Programme	Bachelor of Science (B.Sc.) NEP-2.0		
Course	Computer Sci.	Course Type	Semester
Part	I	Semester	I
Paper No.	I	Course Code	DSC H1
Total Credits	02	Total Marks	50
Paper No.	II	Course Code	DSC H2
Total Credits	02	Total Marks	50
Implementation	2021 - 22	Contact Hours	05 / Week

Primary Information:			
Programme	Bachelor of Science (B.sc.) NEP-2.0		
Course	Computer Sci.	Course Type	Semester
Part	I	Semester	II
Paper No.	III	Course Code	DSC H3
Total Credits	02	Total Marks	50
Paper No.	IV	Course Code	DSC H4
Total Credits	02	Total Marks	50
Implementation	2021 - 22	Contact Hours	05 / Week

Course Objectives:	
i)	To learn basics of Computer, hardware, software, networking.
ii)	To inculcate the software development attitude and generate interest in the field of Technology.
iii)	To develop programming skills, Project Analysis skill, software development skill among the students.
iv)	To inculcate research attitude among students

Course	B.Sc.	Semester	I
Course Code	DSC H1	Paper No.	I
Total Credits	02	Total Marks	50
Implementation	2021 - 22	Contact Hours	05 / Week
Paper Name	Problem Solving Using Computers		

Course Syllabi: (CR = Credits / IH: Instructional Hours)		
Modules	CR	IH
Module I : Problem Solving Using 'C'		
1.1 Planning the Computer Program: Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation	01	15
1.2 Program Design Tools: Algorithm, flow chart, Pseudo code.		
1.3 Introduction to Linux Operating System and C Language, Introduction to Vi, Introduction to GCC Compiler, Components of Compilation Process.		
1.4 Introduction to C Language :History, Features, Structure Of C program, Installation of C		
1.5 Variable Declaration		
1.6 Data Types		
1.7 Format Specifiers		
1.8 Escape Sequences		
1.9 Input / Output Statement		
1.10 Operators		
1.11 Build 1 st C Program		
1.12 Debugging and compilation		
1.13 Execution of Program		
Module II : Control Structures, Array and String		
2.1 Conditional Branching Statements: Simple if statement, If... else statement, else...if ladder, Nested if...else statement, Switch statement	01	15
2.2 Looping Statements: While loop, do...while loop, for loop, nested loop		

2.3 Unconditional Control Statements: BREAK , CONTINUE , RETURN, GOTO		
2.4 Arrays: Introduction, Features ,Definition, Declaration and Initialization of an Array, Types of Arrays : One Dimensional, Two Dimensional, Multi Dimensional		
2.5 String: Introduction, Features ,Definition, Declaration&Initializing a String , String function : strlen(), strcpy(), strcat(), strcmp(), strrev()		

Course Outcomes:
On completion of the course, students will be able to use algorithm and flowchart.
Student should understand the basics of C programming.
Student should be able to develop logic of Problem Solving
Student should able to handle multiple data.

Practical Experiments Based on DSC H1	
1.	WAP to demonstrate use of data types, simple Operators.
2.	WAP to demonstrate use of Conditional Statements (if, if-else, nested if).
3.	WAP to demonstrate use of Conditional Statement(Switch Case)
4.	WAP to demonstrate use of Loops (While, for, do-While)
5.	WAP to demonstrate use of nested loop.
6.	WAP to demonstrate use of unconditional control statements (Break, Continue, goto)
7.	WAP to demonstrate use of one dimensional array.
8.	WAP to demonstrate use of two dimensional arrays
9.	WAP to demonstrate concept of String.
10	WAP to demonstrate use of string functions.

Course	B.Sc.	Semester	I
Course Code	DSC H2	Paper No.	II
Total Credits	02	Total Marks	50
Implementation	2021 - 22	Contact Hours	05 / Week
Paper Name	Database Management System		

Course Syllabi: (CR = Credits / IH: Instructional Hours)		
Modules	CR	IH

Module I : Introduction to Database Management Systems			
1.1 DBMS – Definition, Characteristics, need of DBMS, Advantages of DBMS, Characteristics of database approach, DBMS Architecture		01	15
1.2 Data Models : Hierarchical, Network, Relational			
1.3 Schema and Instances			
1.4 DBMS architecture: Three Schema Architecture, Internal, Conceptual, External			
1.5 Data independence: Logical, Physical			
Module II : Entity Relationship Model			
2.1 ER Model ,Components of ER Model : Entities , attributes(Type of attributes), Domain ,Tuples , relationship, Notations of ER Model Relationships: one-one, one-many, many-one,-many		01	15
2.2 Construction of EER model			
2.3 SQL Concepts			
2.4 Constraints: Domain Integrity, Entity, Referential, And Concept of Object modelling			
2.5 SQL Statements : DDL Statements (create, alter, drop), DML Statements (insert, update, delete), DQL Statements (select)			
2.6 SQL Operators : Logical, Relational, in, between, like, not, is null			
2.7 SQL Clauses: Where, Order by, Group by , Having			
2.8 Aggregate Functions :SUM, MAX, MIN, COUNT,AVG			

Course Outcomes:
Students should learn the basics of data, information, system and Database.
Students should understand the Key concepts of Database and importance and use of ERD.
Students should understand basics SQL statements.

Practical Experiments Based on Paper DSC H2	
Note: MySQL may be used.	
1.	Practical based on DML Commands
2.	Practical based on DDL Commands
3.	Practical based on DQL Commands

4.	Practical Based on Use of Logical Operators.
5.	Practical Based on Use of Relational Operators.
6.	Practical Based on Use of Operators.(in, between, like, not, is null)
7.	Practical Based on SQL Clauses
8.	Practical Based on Aggregate Functions

Reference Materials	
Books for Reference	
1.	“C Programming in an Open Source Paradigm: A Hands on approach”, K.S.Oza, S.R.Patil, R.K.Kamat River Publisher Series in Information Science and Technology, Netherland 978-87-93237-67-4 ,2015
2.	ANSI C – E.Balgurusamy
3.	Let us C – Y.C.Kanetkar
4.	C’ programming – DennisRitchie
5.	Programming in ‘C’ –Venugopal
6.	R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
7.	R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002.
8.	A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill,2010.
9.	R.Elmasri,S.B.NavatheDatabaseSystemsModels,Languages,Designandapplication Programming, 6th Edition, PearsonEducation,2013.
10.	SQL, PL/SQL The Programming Language of ORACLE by Ivan Bayross.

Course	B.Sc.	Semester	II
Course Code	DSC H3	Paper No.	III
Total Credits	02	Total Marks	50
Implementation	2021 - 22	Contact Hours	04 / Week
Paper Name	Programming Skills Using 'C'		

Course Syllabi: (CR = Credits / IH: Instructional Hours)				
Modules			CR	IH
Module I : Functions & Pointers				
1.1 Function : Introduction, Definition, Types of Function, Declaration and defining function, Calling Function (Call by Value & Call by Reference), return statement, Recursion			01	15
1.2 Storage classes				
1.3 Pointers : Introduction, Declaration, Initialization, Pointer Arithmetic, Arrays and Pointers, Function and Pointers Advantages of Pointer				
Module II : Structure and File Handling				
2.1 Structure : Introduction, definition, Declaration, Structure Variables, Accessing Structure Members, Structure initialization, Nested Structure, Array of structure			01	15
2.2 Dynamic Memory Allocation: Introduction, Definition, functions of dynamic memory allocation				
2.3 File Handling: Defining and opening a file, File opening modes-read, write, append, closing a file. Input/Output Operations on file: getc(), putc(), getw(), putw(), fprintf(), fscanf(), ftell(), fseek(), rewind()				

Course Outcomes:
On completion of the course, students will be able to handle programming functions.
Student should understand the basics of structure and pointer.
Students should understand runtime file handling mechanisms.

Practical Experiments Based on DSC H3

1.	WAP to demonstrate writing C programs in modular way (Use of User Defined Functions)
2.	WAP to demonstrate concept of calling function (Call by value , call by reference)

3.	WAP to demonstrate recursive function.
4.	WAP to demonstrate concept of Pointer.
5.	WAP to demonstrate concept of Structure.
6.	WAP to demonstrate concept of Array of Structure.
7.	WAP to demonstrate concept of dynamic memory allocation.
8.	WAP to demonstrate concept of file handling.
9.	WAP to demonstrate concept of input/output operations on file.

Course	B.Sc.	Semester	II
Course Code	DSC H4	Paper No.	IV
Total Credits	02	Total Marks	50
Implementation	2021 - 22	Contact Hours	04 / Week
Paper Name	Relational Database Management System		

Course Syllabi: (CR = Credits / IH: Instructional Hours)			
Modules	CR	IH	
Module I : Introduction to RDBMS			
1.1 Introduction : Definition, Difference Between DBMS And RDBMS, DataTypes	01	15	
1.2 Relational constraint: not null, unique, primary, foreign, check			
1.3 Relational algebra: Select, Project, Union, Intersection			
1.4 EER to relational mapping: Concept of Extended Entity Relationship Diagram (EER), Specialization, Generalization, Aggregation			
1.5 Functional dependencies: Primary Key, Super Key, Candidate Key, Functional Decomposition.			
1.6 Normalization: First NF (1NF), Second NF (2NF), Third			

NF (3NF), and Boyce- Codd NF (BCNF).		
Module II : MySQL		
2.1 MySQL Database : Create, Select, Show, Drop		
2.2 MySQL Joins : Self Join, Inner join, Outer Join(Left Outer, Right Outer, Full Outer)	01	15
2.3 MySQL Sub-Queries : Syntax, subquery with(Comparison Operators, In, Not In ,from Clause,EXIST,Non-EXIST,All,Any,Some), Co-related Subqueries		
2.4 MySQL Views: Create View, Update View, Drop View, Rename View		
2.5 MySQL Indexes : Create Index, Drop Index, Show Index, Unique Index, Clustered Index		
2.6 MySQL Cursor : Declare Cursor, Open Cursor, Fetch Cursor, Close Cursor		
2.5 MySQL Trigger : Create Trigger, Show Trigger, Drop Trigger, Types of Trigger		
Course Outcomes:		
Students should normalize data to its various forms using Sample.		
Student should write the sql queries for joining tables, sub query, Cursor Triggers etc.		
Student should implement the knowledge of RDBMS into real life data		

Practical Experiments Based on DSC H4

1.	Practical Based on use of Constraints.
2.	Practical based on Sub-queries.
3.	Practical based on Joins.
4.	Practical based on Views.
5.	Practical based on Index.
6.	Practical based on cursor.
7.	Practical based on trigger.

Suggested methods of Teaching:

i)	Offline Traditional Board Teaching
ii)	Power Point Presentation
iii)	Online Teaching on platform of Zoom or Google Meet

Reference Materials

Books for Reference

1.	“C Programming in an Open Source Paradigm: A Hands on approach”, K.S.Oza, S.R.Patil, R.K.Kamat River Publisher Series in Information Science and Technology, Netherland 978-87-93237-67-4 ,2015
2.	ANSI C – E.Balgurusamy
3.	Let us C – Y.C.Kanetkar
4.	C’ programming – DennisRitchie
5.	Programming in ‘C’ -Venugopal
6.	R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
7.	R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002.
8.	A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill,2010.
9.	SQL, PL/SQL The Programming Language of ORACLE by Ivan Bayross

Examination Pattern:

1.1 End Semester Examination Question Paper Pattern : 30 Marks

Q. No.	Nature /Type of Question	Marks	Total
1.	Multiple Choice Question (06)	Each for 01 Marks	06
2.	Short answer (06)	Each for 01 Marks	06
3.	Short notes Solve any 2 out of 3	Each for 03 Marks	06
4.	Descriptive Questions Solve Any 2 out of 5	Each for 06 Marks	12
Total			30

1.1 Continuous Internal Evaluation(CIE) Pattern : 20 Marks

MCQ Test(Online/Offline)	10 Marks
Surprise Test / Assignment	10 Marks
Total	20 Marks

1.2 End Semester Practical Examination

The practical examination in Computer Science is conducted at end of each semester which will be based on Course DSC H1 and DSC H2, DSC H3 and DSC H4 of 3 hours duration and of 50 maximum marks.

- **Nature of Practical Examination:**

Paper Name	Practical Paper -I
Total No. Of Questions	04
No. Of questions should be attempt	02
Each Question	20 Marks(Total 40 Marks)
Certified Journal	05 Marks
Viva Based on Practical	05 Marks
Total Marks	50

- To pass the B.Sc. Part-I,II&III examination, a candidate shall be required to obtain a minimum of 35% of the total Marks in each head of passing.
- There will be a separate head of passing in Theory, internal and Practical courses.