Estd. 1962
"A++" Accredited by NAAC(2021) With CGPA 3.52

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शिवाजी विद्यापीठ, कोल्हापूर - ४१६००४,महाराष्ट्र
दूरध्वनी - ईपीएबीएक्स - २६०९०००, अभ्यासमंडळे विभाग दुरध्वनी विभाग २३१–२६०९०९३/९४

**SU/BOS/Science/** 72 **Date: 15 / 11 / 2022**

**To,**
The Principal,
All Affiliated Concerned Science Colleges/Institutions
Shivaji University, Kolhapur.

**Subject :- Regarding syllabi of M. Sc. & B. Sc. Part- I (NEP-2020) degree programme under the Faculty of Science and Technology as per National Education Policy 2020 .**

**Sir/Madam,**

With reference to the subject mentioned above, I am directed to inform you that the university authorities have accepted and granted approval to the syllabi and Nature of question paper of **M. Sc. & B. Sc. Part -I** under the Faculty of Science and Technology **as per National Education Policy 2020 .**

| Sr. No. | Faculty of Science and Technology | Programme/ Course |
|---|---|---|
| 1 | Computer Science Engineering and Technology | M. Sc. Computer Science (Online Mode दुरशिक्षण केंद्र) |
| | | B. Sc. Part -I Computer Science (Entire) |
| | | B. Sc. Part -I Computer Science (Optional) |
| | | B. Sc. Part - I Information Technology |

This syllabi and nature of question paper shall be implemented from the Academic Year **2022-2023** onwards. A soft copy containing the syllabus is attached herewith and it is also available on university website www.unishivaji.ac.in (students Online Syllabus)

You are, therefore, requested to bring this to the notice of all students and teachers concerned.

Thanking you,

**Yours faithfully,**

**Dy Registrar**

**Copy to:**

| | | | |
|---|---|---|---|
| 1 | The Dean, Faculty of Science & Technology | 7 | Appointment Section |
| 2 | Director, Board of Examinations and Evaluation | 8 | P.G.Seminar Section |
| 3 | The Chairman, Respective Board of Studies | 9 | Computer Centre ( I.T.) |
| 4 | B.Sc. Exam | 10 | Affiliation Section (U.G.) |
| 5 | Eligibility Section | 11 | Affiliation Section (P.G.) |
| 6 | O.E. I Section | 12 | P.G.Admission Section |

# SHIVAJI UNIVERSITY, KOLHAPUR.

**Accredited By NAAC with 'A++' Grade**

**Choice Based Credit System with Multiple Entry and Multiple Exit Option**

**(NEP-2020)**

**CHOICE BASED CREDIT SYSTEM**

**Syllabus for**

## B.Sc. Part – I

## COMPUTER SCIENCE

**SEMESTER – I AND II**

**(Syllabus to be implemented from Academic Year 2022-23)**

# Choice Based Credit System with Multiple Entry and Multiple Exit Options

## To be implemented from the Academic Year 2022-23

### First Year Bachelor of Science (Level-5) Programme Structure (NEP-2020 PATTERN)

**S E M E S T E R – I (Duration – 6 Months)**

| Courses | Sr. No. | Course Code | TEACHING SCHEME | | | | | | EXAMINATION SCHEME | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | THEORY | | | PRACTICAL | | | THEORY | | | | PRACTICAL | | |
| | | | Credits | No. of lectures | Hours | Credits | No. of lectures | Hours | Hours | Max | Total Marks | Min | Hours | Max | Min |
| CGPA COURSES | 1 | DSC-A | 2 | 5 | 4 | 2 | 4 | 3.2 | 2 | 50 | 100 | 35 | PRACTICAL EXAMINATION IS ANNUAL | | |
| | 2 | DSC-A | 2 | | | | | | 2 | 50 | | | | | |
| | 3 | DSC-A | 2 | 5 | 4 | 2 | 4 | 3.2 | 2 | 50 | 100 | 35 | | | |
| | 4 | DSC-A | 2 | | | | | | 2 | 50 | | | | | |
| | 5 | DSC-A | 2 | 5 | 4 | 2 | 4 | 3.2 | 2 | 50 | 100 | 35 | | | |
| | 6 | DSC-A | 2 | | | | | | 2 | 50 | | | | | |
| | 7 | DSC-A | 2 | 5 | 4 | 2 | 4 | 3.2 | 2 | 50 | 100 | 35 | | | |
| | 8 | DSC-A | 2 | | | | | | 2 | 50 | | | | | |
| | 9 | AECC- A | 2 | 4 | 3.2 | - | - | - | 2 | 50 | 50 | 18 | | | |
| | | TOTAL (A) | 18 | | | 8 | 16 | | | | 450 | | | | |
| Non CGPA | 10 | SEC-1 | - | - | - | 2 | 4 | 4 | | | | | | | |
| | 11 | VBC-1 | | | | 1 | 2 | 2 | | | | | | | |

**S E M E S T E R –II (Duration – 6 Months)**

| | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CGPA COURSES | 1 | DSC-B | 2 | 5 | 4 | 2 | 4 | 3.2 | 2 | 50 | 100 | 35 | As per BOS Guide-lines | 50 | 18 |
| | 2 | DSC-B | 2 | | | | | | 2 | 50 | | | | | |
| | 3 | DSC-B | 2 | 5 | 4 | 2 | 4 | 3.2 | 2 | 50 | 100 | 35 | | 50 | 18 |
| | 4 | DSC-B | 2 | | | | | | 2 | 50 | | | | | |
| | 5 | DSC-B | 2 | 5 | 4 | 2 | 4 | 3.2 | 2 | 50 | 100 | 35 | | 50 | 18 |
| | 6 | DSC-B | 2 | | | | | | 2 | 50 | | | | | |
| | 7 | DSC-B | 2 | 5 | 4 | 2 | 4 | 3.2 | 2 | 50 | 100 | 35 | | 50 | 18 |
| | 8 | DSC-B | 2 | | | | | | 2 | 50 | | | | | |
| | 9 | AECC- B | 2 | 4 | 3.2 | -- | -- | -- | 2 | 50 | 50 | 18 | | 200 | 18 |
| | | TOTAL ( B ) | 18 | | | 8 | 16 | | | | 450 | | | | |
| | | TOTAL (A+B) | 36 | | | 16 | | | | | 900 | | | | |
| Non CGPA | 10 | SEC-2 | - | - | - | 2 | 4 | 4 | | | | | | | |
| | 11 | VBC-2 | | | | 1 | 2 | 2 | | | | | | | |

- Student contact hours per week : 32 Hrs (Minimum)
- Theory and Practical Lecture Duration: 48 mineach
- Total Marks for B.Sc.- I : **1100**
- Total Credits for B.Sc.-I (Sem I & II) : **52**
- Practical Examination will be conducted annually for 50 marks per course.
- **AECC:** Ability Enhancement Compulsory Course (A & B) : English for communication
- **SEC:** Skill Enhancement Course (Vocational Studies): Field Projects/ Internship/ Apprentiship/ Community Engagement and Service. Any one from pool of courses. For SEC courses there shall be only practical examination of 50 marks. **VBC:** Value Based Course (NSS/NCC/Sports/Cultural, etc.)
- Except English, there shall be combined passing for two theory courses of 50 marks each. i.e. minimum 35 marks are required for passing out of 100. There shall be separate passing for theory and practical.
- ***Exit option after Level 5: Students can exit with Certificate Course in Science (with the completion of courses equal to minimum of 52 credits).***

# B. Sc. Part – I Semester – I: List of Courses

## Discipline Specific Core (DSC) Courses

| Course code | Name of the Course | Course code | Name of the Course |
|---|---|---|---|
| **B. Sc. Part-I: Sem-I DSC : A1 to A38** | | | |
| **DSC A1** | Physics I | **DSC A21** | Geology I |
| **DSC A2** | Physics II | **DSC A22** | Geology II |
| **DSC A3** | Chemistry I | **DSC A23** | Seed Technology I |
| **DSC A4** | Chemistry II | **DSC A24** | Seed Technology II |
| **DSC A5** | Mathematics I | **DSC A25** | Microbiology I |
| **DSC A6** | Mathematics II | **DSC A26** | Microbiology II |
| **DSC A7** | Statistics I | **DSC A27** | Industrial Microbiology I |
| **DSC A8** | Statistics II | **DSC A28** | Industrial Microbiology II |
| **DSC A9** | Electronics I | **DSC A29** | Biochemistry I |
| **DSC A10** | Electronics II | **DSC A30** | Biochemistry II |
| **DSC A11** | Computer Science I | **DSC A31** | Psychology I |
| **DSC A12** | Computer Science II | **DSC A32** | Psychology II |
| **DSC A13** | Botany I | **DSC A33** | Food Science & Quality control-I |
| **DSC A14** | Botany II | **DSC A34** | Food Science & Quality control-II |
| **DSC A15** | Zoology I | **DSC A35** | Astrophysics I |
| **DSC A16** | Zoology II | **DSC A36** | Astrophysics II |
| **DSC A17** | Biotechnology (Opt) I | **DSC A37** | Nanotechnology (opt) I |
| **DSC A18** | Biotechnology (Opt) II | **DSC A38** | Nanotechnology (opt) II |
| **DSC A19** | Geography I | | |
| **DSC A20** | Geography II | **AECC – A** | English Paper – I |

DSC: Discipline Specific Core Course

AECC – Ability Enhancement Compulsory Course

AECC – A – English Paper– I

## Link for the pool of SEC courses from National Skills Qualification Framework (NSQF)

(You may add or delete any courses as per available facilities)

https://drive.google.com/file/d/176Vwvx4SC2ONrt69XADruzI2qnfBPI_o/view?usp=sharing

# B. Sc. Part – I Semester – II: List of Courses

## Discipline Specific Core (DSC) Courses

| Course code | Name of the Course | Course code | Name of the Course |
|---|---|---|---|
| **B. Sc. Part-I: Sem-II DSC : B1 to B38** | | | |
| **DSC B1** | Physics III | **DSC B21** | Geology III |
| **DSC B2** | Physics IV | **DSC B22** | Geology IV |
| **DSC B3** | Chemistry III | **DSC B23** | Seed Technology III |
| **DSC B4** | Chemistry IV | **DSC B24** | Seed Technology IV |
| **DSC B5** | Mathematics III | **DSC B25** | Microbiology III |
| **DSC B6** | Mathematics IV | **DSC B26** | Microbiology IV |
| **DSC B7** | Statistics III | **DSC B27** | Industrial Microbiology III |
| **DSC B8** | Statistics IV | **DSC B28** | Industrial Microbiology IV |
| **DSC B9** | Electronics III | **DSC B29** | Biochemistry III |
| **DSC B10** | Electronics IV | **DSC B30** | Biochemistry IV |
| **DSC B11** | Computer Science III | **DSC B31** | Psychology III |
| **DSC B12** | Computer Science IV | **DSC B32** | Psychology IV |
| **DSC B13** | Botany III | **DSC B33** | Food Science & Quality control II |
| **DSC B14** | Botany IV | **DSC B34** | Food Science & Quality control IV |
| **DSC B15** | Zoology III | **DSC B35** | Astrophysics III |
| **DSC B16** | Zoology IV | **DSC B36** | Astrophysics IV |
| **DSC B17** | Biotechnology (Opt) III | **DSC B37** | Nanotechnology (opt) III |
| **DSC B18** | Biotechnology (Opt) IV | **DSC B38** | Nanotechnology (opt) IV |
| **DSC B19** | Geography III | | |
| **DSC B20** | Geography IV | **AECC – B** | English Paper – II |

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

**Choice Based Credit System with Multiple Entry and Multiple Exit Option**
**(NEP-2020)**

## Syllabus to be implemented from Academic Year 2022-23

1. **TITLE: Computer Science**
2. **YEAR OF IMPLEMENTATION:** Revised Syllabus will be implemented from June 2022 onwards.
3. **DURATION:** B.Sc. in Computer Science Part – I. The duration of course shall be one year and two semesters.
4. **PATTERN:** Pattern of examination will be semester.
5. **STRUCTURE OF COURSE:**

**STRUCTURE OF COURSE**

| Sr. No. | Paper | Name of Paper | Marks |
|---|---|---|---|
| **Computer Science (Semester – I)** | | | |
| 1 | DSC – A11 | Problem Solving using Computers | 50 ( Theory) |
| 2 | DSC – A12 | Database Management System | 50 ( Theory) |
| **Computer Science (Semester – II)** | | | |
| 3 | DSC – B11 | Programming Skills Using 'C' | 50 ( Theory) |
| 4 | DSC – B12 | Relational Database Management System | 50 ( Theory) |
| **Practical ( Annual )** | | | |
| 5 | Practical Paper – I | Computer Science Practical Paper Based on DSC-A11 and DSC-B11 DSC-A12 and DSC-B12 | 50 (Practical) |

B. Sc. Part – I Semester – I

# COMPUTER SCIENCE

## DSC-A11 : Problem Solving using Computers

Theory: 30 hrs. (37.5 lectures of 48 minutes)

Marks – 50 (**Credits: 02)**

**Course Outcomes:** Upon successful completion of the course students will able to:

1) Demonstrate a familiarity of computer programming language concepts.
2) Understand to develop C programs on Linux platform.
3) Apply C programming control structures for problem solving.
4) Understand working and implementation of arrays.

### Unit – 1 Problem Solving Using Computers (15 hrs.)

**(A) Planning the Computer Program:** Concept of problem solving, Problem definition, Program design, Debugging, Types of errors in programming, Documentation.

**(B) Logical Continuum of Program of Programming :** Linux Operating System and C Language, Introduction to GCC Compiler, Components of Compilation Process, Getting Used to the Data Types , Built-In Standard Library, Nitty-Gritty of Programming, structures, Algorithm, Pseudocode, Procedure, Program, C Program Structure, Vi Editor, Whittling the First 'C' Program, Checking Whether the Compiler Is Working, Execution of Make file, Variable Declaration , Input / Output Statement, Format Specifiers, Escape Sequences, Operators.

### Unit – 2 Control Structures and Arrays (15 hrs.)

**(A) Decision Making and Looping Constructs:** Introduction, The if Statement, The if-else Statement, Nested if-else, The Switch Case Statement, The while Loop, The odd Loop (do while), the for Loop, Loop Control Statements, Infinite Loop.

**(B) Arrays:** Features, Definition, Types of Arrays, Single-Dimensional Array, Two-Dimensional Array, Multi-Dimensional Array.

## DSC-A12 Database Management System

Theory: 30 hrs. (37.5 lectures of 48 minutes)

Marks – 50 (**Credits: 02)**

**Course Outcomes:** Upon successful completion of the course students will able to:

1) Describe the basic concepts of DBMS and various databases used in real applications.
2) Demonstrate the principles behind systematic database design approaches.

**Unit – 1 Introduction to Database Management Systems (15 hrs.)**

Characteristics of database approach, Data models: Hierarchical, Network, Relational, Schema and Instances, DBMS architecture: Three Schema Architecture, Internal, Conceptual, External, Data independence: Logical, Physical.

**Unit – 2 Entity Relationship and Enhanced ER Modeling (15 hrs.)**

Entity: Entities: Domain, Attributes, Tuples, Relations, Entity Relationships: one-one, one-many, many-one, many-many, SQL-99: Schema Definition, Constraints: Domain Integrity, Entity, Referential, And Concept of Object modeling.

**Reference Books:**

(For DSC-A11: Unit – 1 and Unit – 2)


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 – Dennis Ritchie
5. Programming in 'C' - Venugopal


(For DSC-A12: Unit – 1 and Unit – 2)


1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
2. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002.
3. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.
4. R. Elmasri, S.B. Navathe Database Systems Models, Languages, Design and application Programming, 6th Edition, Pearson Education, 2013.

# B. Sc. Part – I Semester – II

## COMPUTER SCIENCE

### DSC-B11 Programming Skills Using 'C'

Theory: 30 hrs. (37.5 lectures of 48 minutes)
Marks – 50 (**Credits: 02)**

**Course Outcomes:** Upon successful completion of the course students will able to:

1) Understand the concept and importance of pointers in C language.
2) Demonstrate an understanding of functions in problem solving.
3) Understand working of structure and dynamic memory allocation.
4) Apply file handling techniques using C language.

**Unit – 1 Pointers and Functions: (15 hrs.)**

**(A) Pointers:** Pointer Data Type, Pointer Declaration, Pointer Initialization, Arrays and Pointers, Pointers and One-Dimensional Arrays, Pointers and Two-Dimensional Arrays

**(B) Programming for Functional Functions:** Introduction, Function Declaration, Function Definition, Function Call, Nested Functions Recursion.

**Unit – 2 Structures and File Handling: (15 hrs.)**

**(A) Structure and Dynamic Memory Allocation:** User-Defined Data Types, Defining Structure, Nesting of Structure, Dynamic Memory Allocation,.

**(B) 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().

### DSC-B12 Relational Database Management System

Theory: 30 hrs. (37 lectures of 48 minutes)
Marks – 50 (**Credits: 02)**

**Course Outcomes:** Upon successful completion of the course students will able to:

1) Understand the importance and working of database.
2) Demonstrate an understanding of the relational data model.
3) Understand the concept of normalization and apply such knowledge to the normalization of a database.
4) Apply SQL queries for database management.

**Unit – 1 Relational Data Model (15 hrs.)**

Basic concept, Relational constraint: not null, unique, primary, foreign, check, Relational. algebra: Select, Project, Union, Intersection, Difference, SQL queries: DDL : create, alter, drop, DML : insert, update, delete, DQL : select. SQL operator:

Logical, relational, in, between, like, not, is null. SQL Clauses: Where, Order by, Group by , Having, Aggregate Functions :SUM, MAX, MIN, COUNT, AVG.

**Unit – 2 Database design (15 hrs.)**

Entity Relationship (ER): Basic Structures of Entity Relationship (ER), Symbols, Construction of ER Diagram, Example: Library Management System, EER to relational mapping: Concept of Extended Entity Relationship Diagram (EER), Specialization, Generalization, Aggregation. Functional dependencies: Key, Primary, Super Key, Candidate Key, Functional Decomposition, Normal forms: First NF (1NF), Second NF (2NF), Boyce-Codd NF (BCNF) Third NF (3NF).

**Reference Books:**

(For DSC-B11: Unit – 1 and Unit – 2)


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 – Dennis Ritchie
5. Programming in 'C' - Venugopal


(For DSC-B12: Unit – 1 and Unit – 2)


1. R. Elmasri, S.B. Navathe, Fundamentals of Database Systems 6th Edition, Pearson Education, 2010.
2. R. Ramakrishanan, J. Gehrke, Database Management Systems 3rd Edition, McGraw-Hill, 2002.
3. A. Silberschatz, H.F. Korth, S. Sudarshan, Database System Concepts 6th Edition, McGraw Hill, 2010.
4. R. Elmasri, S.B. Navathe Database Systems Models, Languages, Design and application Programming, 6th Edition, Pearson Education, 2013.

# PRACTICAL PAPER – I

**Computer Science Practical Paper Based on**
**DSC-A11 and DSC-B11**

**DSC-A12 and DSC-B12**

**Practical:** Four lectures of 48 minutes (3.2 hrs) per week per batch.

Marks – 50 (**Credits: 02 + 02 = 04)**

**Practical Experiments:**

**Based on DSC-A11 and DSC-B11**

1. Write a menu driven program to convert the given temperature from Fahrenheit to Celsius and vice versa depending upon user's choice.
2. WAP to calculate total marks, percentage and grade of a student. Marks obtained in each of the three subjects are to be input by the user. Assign grades according to the following criteria:

   Grade A: Percentage >=80
   Grade B: Percentage>=70 and <80
   Grade C: Percentage>=60 and <70
   Grade D: Percentage>=40 and <60
   Grade E: Percentage<40
3. Write a menu-driven program, using user-defined functions to find the area of rectangle, square, circle and triangle by accepting suitable input parameters from user.
4. WAP to display the first n terms of Fibonacci sequence.
5. WAP to print palindrome numbers between given range.
6. WAP to find sum of the following series for n terms: 1 – 2/2! + 3/3! ------ n/n!
7. WAP to sort given array in ascending as well as descending order.
8. WAP to calculate the sum and product of two compatible matrices.
9. WAP to check whether a given number is prime or not using nested function by introducing factorial function."P is prime number if and only if (P-1)! + 1 is divisible by P".
10. WAP to calculate factorial of given number using recursive function.
11. WAP to dynamically allocate memory of n items to an integer pointer, display their sum and average.
12. WAP to swap two numbers using function (call by reference).
13. WAP to dynamically allocate memory of n items to a character array, end it with '\0' and count number of vowels, consonants and spaces in it.
14. WAP to using user defined data type structure to store information of a student rollno, name, percentage. Create array of 10 students and display students having percentage > 70.
15. WAP to copy contain of text file into another text file.
16. WAP to count number of lines and characters of given text file.

**Based on DSC-A12 and DSC-B12**

**Note: MySQL may be used.**

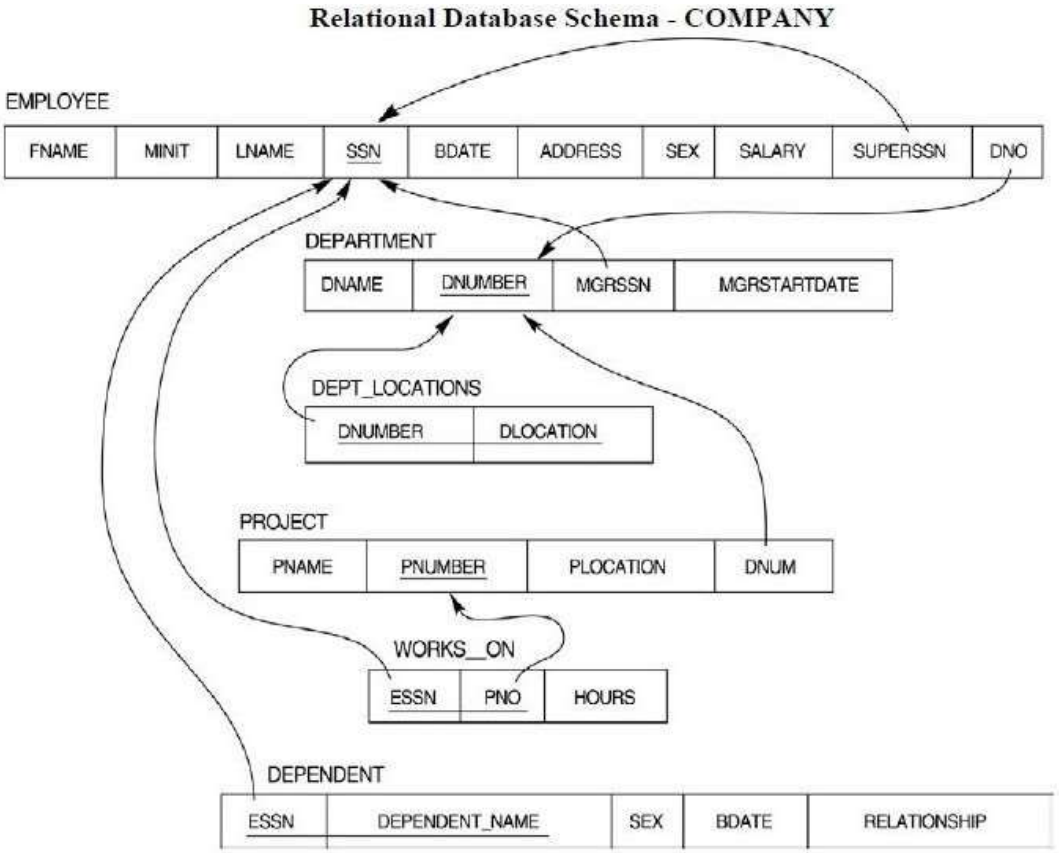
The following concepts must be introduced to the students:

**DDL Commands**

- Create table, alter table, drop table

**DML Commands**

- Select , update, delete, insert statements
- Condition specification using Boolean and comparison operators (and, or, not, =, <>, >, <, >=, <=)
- Arithmetic operators and aggregate functions(Count, sum, avg, Min, Max)
- Multiple table queries (join on different and same tables)
- Nested select statements
- Set manipulation using (any, in, contains, all, not in, not contains, exists, not exists, union, intersect, minus, etc.)
- Categorization using group by ..... having
- Arranging using order by




**Questions to be performed on above schema**

1. Create tables with relevant foreign key constraints
2. Populate the tables with data

3. Perform the following queries on the database :

1) Display all the details of all employees working in the company.
2) Display ssn, lname, fname, address of employees who work in department no 7.
3) Retrieve the birthdate and address of the employee whose name is 'Franklin T. Wong'
4) Retrieve the name and salary of every employee
5) Retrieve all distinct salary values
6) Retrieve all employee names whose address is in ‘Bellaire’
7) Retrieve all employees who were born during the 1950s
8) Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)
9) Retrieve the names of all employees who do not have supervisors
10) Retrieve SSN and department name for all employees
11) Retrieve the name and address of all employees who work for the 'Research' department
12) For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birthdate.
13) For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.
14) Retrieve all combinations of Employee Name and Department Name
15) Make a list of all project numbers for projects that involve an employee whose last name is 'Narayan’ either as a worker or as a manager of the department that controls the project.
16) Increase the salary of all employees working on the 'ProductX' project by 15%. Retrieve employee name and increased salary of these employees.
17) Retrieve a list of employees and the project name each works in, ordered by the employee's department, and within each department ordered alphabetically by employee first name.
18) Select the names of employees whose salary does not match with salary of any employee in department 10.
19) Retrieve the name of each employee who has a dependent with the same first name and same sex as the employee.
20) Retrieve the employee numbers of all employees who work on project located in Bellaire, Houston, or Stafford.
21) Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. Display with proper headings.
22) Find the sum of the salaries and number of employees of all employees of the ‘Marketing’ department, as well as the maximum salary, the minimum salary, and the average salary in this department.
23) Select the names of employees whose salary is greater than the average salary of all employees in department 10.

24) For each department, retrieve the department number, the number of employees in the department, and their average salary.

25) For each project, retrieve the project number, the project name, and the number of employees who work on that project.

26) Change the location and controlling department number for all projects having more than 5 employees to 'Bellaire' and 6 respectively.

27) For each department having more than 10 employees, retrieve the department no, no of employees drawing more than 40,000 as salary.

28) Insert a record in Project table which violates referential integrity constraint with respect to Department number. Now remove the violation by making necessary insertion in the Department table.

29) Delete all dependents of employee whose ssn is '123456789'.

30) Delete an employee from Employee table with ssn = '12345' (make sure that this employee has some dependents, is working on some project, is a manager of some department and is supervising some employees). Check and display the cascading effect on Dependent and Works on table. In Department table MGRSSN should be set to default value and in Employee table SUPERSSN should be set to NULL.

31) Perform a query using alter command to drop/add field and a constraint in Employee table.

- Draw ERD for College Management System, Library Management System, Online Reservation System, Hospital Management System, Hostel Management System.

## 6. EXAMINATION SCHEME

**Theory:** Theory examination will be conducted at the end of each semester. Paper Duration: 2 Hrs., Maximum Marks: 50, Minimum for passing: 35%.

**Practical**: Practical Examination will be conducted annually towards the end of Second Term of every Academic year. Duration: 4 hours, Maximum Marks: 50, Minimum for passing: 35%.

**Nature of Each Theory Question Paper: (Maximum Marks 50)**

| | | |
|---|---|---|
| 1. | Choose correct alternatives. | 10 Marks (Each 01 mark) |
| 2. | Attempt any two (out of three sub questions). | 20 Marks (Each 10 marks) |
| 3. | Attempt any four (out of six sub questions). | 20 Marks (Each 05 marks) |

**Nature of Practical Examination: (Maximum Marks 50)**

The Practical Examination in Computer Science is conducted at end of each academic year which will be based on Paper **DSC-A11 and DSC-B11, DSC-A12 and DSC-B12** of 4 hours duration and of 50 maximum marks. There will be four questions, out of these student has to attempt Any Two questions. The marks distribution for the practical paper is given below:

**Practical Paper - I**

| | |
|---|---|
| Each question carries | : 20 marks (20 X 2 = 40 marks) |
| Certified Journal carries | : 5 marks. |
| Viva based on practical carries | : 5 marks. |

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