

**SRI VENKATESWARA UNIVERSITY**  
**DEGREE COURSE IN BACHELOR OF COMPUTER APPLICATIONS (BCA)**  
**BIG DATA & MACHINE LEARNING**  
**New Course Introduced under CBCS W.E.F. 2021-22**

**SCHEME OF INSTRUCTIONS AND EXAMINATIONS**

**II SEMESTER**

S.No	Paper Code	Subject	Hours/ Week	No of Credits	Max.Marks Internal assessment	Max. Marks University Exam	Total Marks
1.		English – II	4	3	25	75	100
2.		Language(H/T/S) – II	4	3	25	75	100
3.		Life Skill Course – II	2	2	-0-	50	50
4.		Skill Development Course – II	2	2	-0-	50	50
5.		Skill Development Course – III	2	2	-0-	50	50
6.	C4	Database Management Systems	4	3	25	75	100
	C4-P	Database Management Systems (SQL) Lab	2	2	-0-	50	50
7.	C5	Introduction to Machine Learning	4	3	25	75	100
	C5-P	Introduction to Machine Learning Lab	2	2	-0-	50	50
8.	C6	Introduction to Python Programming	4	3	25	75	100

	C6-P	Python Programming Lab	2	2	-0-	50	50
Total			32	27	125	675	800

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**FIRST YEAR - II SEMESTER**  
**(Syllabus under CBCS w.e.f. 2021-22)**

**Core Course Paper – C4: DATABASE MANAGEMENT SYSTEMS**  
(Total hours of teaching – 60 @ 04 Hrs./Week Credits 3)

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**Course Objectives**

The objective of the course is to introduce the design and development of databases with special emphasis on relational databases.

**Course Outcomes**

After successful completion of this course, the student will be able to;

1. Gain knowledge of Database and DBMS.
2. Understand the fundamental concepts of DBMS with special emphasis on relational data model.
3. Demonstrate an understanding of normalization theory and apply such knowledge to the normalization of a database
4. Model database using ER Diagrams and design database schemas based on the model.
5. Create a small database using SQL.
6. Store, Retrieve data in database.

**UNIT I**

**Overview of Database Management System:** Introduction to data, information, database, database management systems, file-based system, Drawbacks of file-Based System, database approach, Classification of Database Management Systems, advantages of database approach, Components of Database Management System, three schema architecture of database.

**UNIT II**

**Data Models, Entity-Relationship Model:** Introduction, the building blocks of ER model, classification of entity sets, attribute classification, relationship degree, relationship classification.

Enhanced entity-relationship model (EER model), generalization and specialization, Inheritance - IS A relationship, constraints on specialization and generalization, advantages of EER modelling.

**UNIT III**

**Relational Model:** Introduction, CODD Rules, relational data model, concept of key, relational integrity, relational algebra, relational algebra operations, advantages of relational algebra, limitations of relational algebra.

**Normalization:** Functional dependencies and normal forms upto 3NF.

**UNIT IV**

**Structured Query Language:** Introduction, History of SQL Standard, Commands in SQL (DDL, DML, DCL, TCL), Data Types in SQL, Aggregate functions, Join Operation, Set Operations, View, Sub Query.

**UNIT V**

**PL/SQL:** Introduction, Structure of PL/SQL, Data Types, Operators Precedence, Control Structure, Program, Iterative Control, Cursors, Procedure, Function, Database Triggers, Types of Triggers.

**Text Books:**

1. Database System Concepts by Abraham Silberschatz, Henry Korth, and S. Sudarshan, McGrawhill
2. Database Management Systems by Raghu Ramakrishnan, McGrawhill
3. Principles of Database Systems by J. D. Ullman
4. Fundamentals of Database Systems by R. Elmasri and S. Navathe
5. SQL: The Ultimate Beginners Guide by Steve Tale.

**REFERENCES BOOKS:**

1. Database Principles, Programming, and Performance, P.O'Neil, E.O'Neil,2nd ed.,ELSEVIER.
2. Database Systems, A Practical approach to Design implementation and Management Fourth edition, Thomas Connolly, carolynBegg, Pearson education.
3. Database Systems Concepts, Peter Rob & Carlos Coronel, Cengage Learning, 2008.

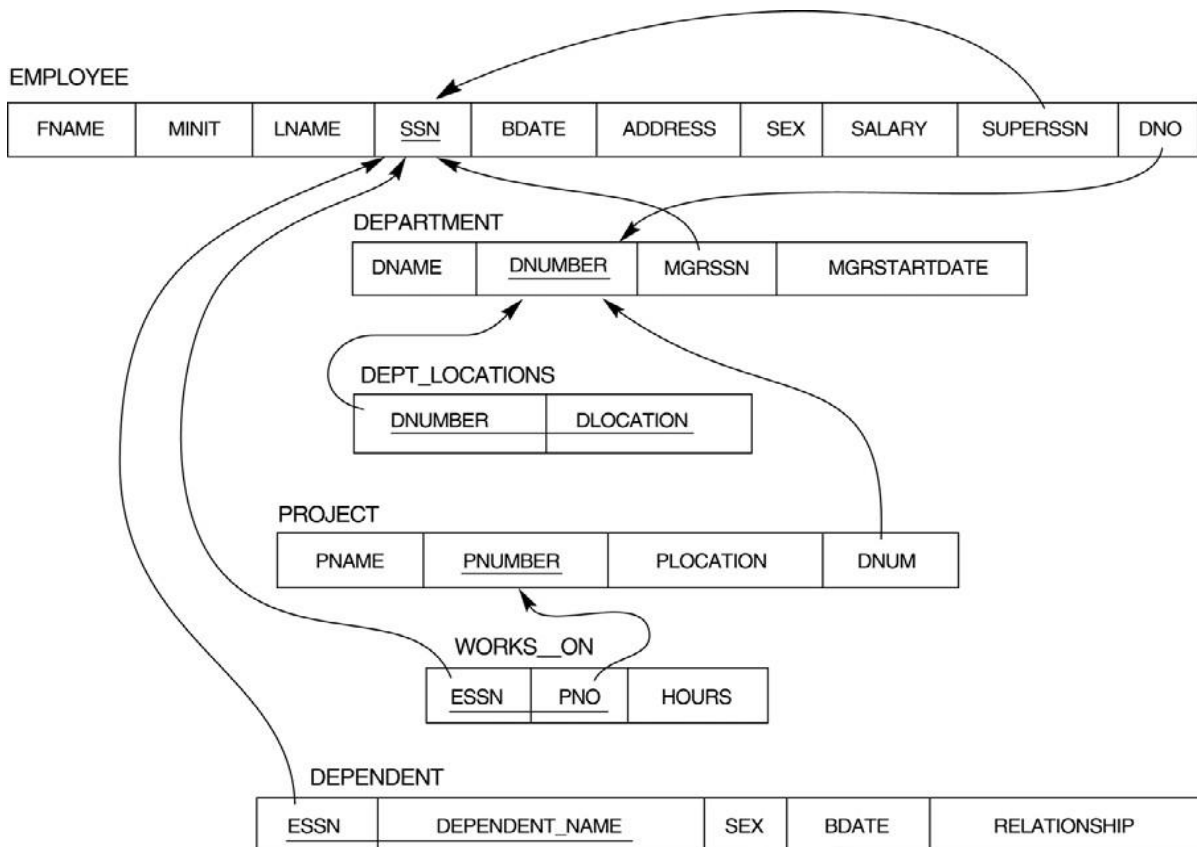
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**Practical Paper – C4P: DATABASE MANAGEMENT SYSTEMS LAB**  
**(Total hours of teaching – 30 @ 02 Hrs./Week Credits 2)**

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1. Draw ER diagram for hospital administration
2. Creation of college database and establish relationships between tables
3. Relational database schema of a company is given in the following figure.

**Relational Database Schema - COMPANY**



**Questions to be performed on above schema**

1. Create above tables with relevant *Primary Key, Foreign Key and other constraints*
2. Populate the tables with data
3. Display all the details of all employees working in the company.
4. Display ssn, lname, fname, address of employees who work in department no 7.

5. Retrieve the Birthdate and Address of the employee whose name is 'Franklin T. Wong'
6. Retrieve the name and salary of every employee
7. Retrieve all distinct salary values
8. Retrieve all employee names whose address is in 'Bellaire'
9. Retrieve all employees who were born during the 1950s
10. Retrieve all employees in department 5 whose salary is between 50,000 and 60,000(inclusive)
11. Retrieve the names of all employees who do not have supervisors
12. Retrieve SSN and department name for all employees
13. Retrieve the name and address of all employees who work for the 'Research' department
14. For every project located in 'Stafford', list the project number, the controlling department number, and the department manager's last name, address, and birth date.
15. For each employee, retrieve the employee's name, and the name of his or her immediate supervisor.
16. Retrieve all combinations of Employee Name and Department Name
17. 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.
18. Increase the salary of all employees working on the 'ProductX' project by 15%. Retrieve employee name and increased salary of these employees.
19. 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.
20. Select the names of employees whose salary does not match with salary of any employee in department 10.
21. Retrieve the employee numbers of all employees who work on project located in Bellaire, Houston, or Stafford.
22. Find the sum of the salaries of all employees, the maximum salary, the minimum salary, and the average salary. Display with proper headings.

23. 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.
24. Select the names of employees whose salary is greater than the average salary of all employees in department 10.
25. Delete all dependents of employee whose *ssn is '123456789'*.
26. Perform a query using alter command to drop/add field and a constraint in Employee table.

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**Core Paper - C4: DATABASE MANAGEMENT SYSTEMS**  
(Statistical tables and Electronic Calculators are allowed)  
**MODEL QUESTION PAPER**

Time: 3 hours

Marks: 75 marks

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks

**PART – A**

Answer any Five of the following question.

(5X5=25M)

1	
2	
3	
4	
5	
6	
7	
8	

**PART – B**

Answer All The Questions. Each question carries 10 marks

(5X10= 50M)

9	(A)	OR
	(B)	
10	(A)	OR
	(B)	
11	(A)	OR
	(B)	
12	(A)	OR
	(B)	
13	(A)	OR
	(B)	



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**Core Course Paper – C5: INTRODUCTION TO MACHINE LEARNING**  
(Total hours of teaching – 60 @ 04 Hrs./Week Credits 3)

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**Course Objectives:**

Learning basic concepts of various machine learning methods is primary objective of this course. This course specifically make student able to learn mathematical concepts, and algorithms used in machine learning techniques for solving real world problems and developing new applications based on machine learning.

**Course Learning Outcomes:**

Upon successful completion of the course, a student will be able to:

1. Apply machine learning techniques on real world problem or to develop AI based application
2. Analyze and Implement Regression techniques.
3. Solve and Implement solution of Classification problem
4. Understand and implement Unsupervised learning algorithms

**UNIT –I**

**Introduction to Machine Learning:** What is Machine Learning, Basic Terminologies of Machine Learning, Applications of ML, Difference between Data Mining and Predictive Analysis, Tools and Techniques of Machine Learning.

**UNIT-II**

Supervised Learning, Unsupervised Learning, Reinforcement Learning. Machine Learning Lifecycle.

**UNIT-III**

**Supervised Learning :** Classification and Regression Classification: K-Nearest Neighbour, Decision Trees, Naïve Bayes, Support Vector Machines. Regression: Model Representation, Linear Regression, Non-Linear Regression

**UNIT-IV**

**Unsupervised and Reinforcement Learning Clustering:** K-Means Clustering, Hierarchical clustering, Density-Based Clustering, Genetic Algorithm.

**UNIT-V**

**Python for Machine Learning** Basics of Python for ML, Python Libraries of ML, Dataset, Apply Algorithms on datasets, Result Analysis from dataset, Future Scope of ML.

**Text Books:**

1. "Machine Learning – A Probabilistic Perspective" by Kevin P. Murphy
2. "Machine Learning (in Python and R) For Dummies" by John Paul Mueller, Luca Massaron

**Reference Books:**

1. "Machine Learning using Python" by U Dinesh Kumar, Manaranjan Pradhan

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**Practical Paper – C5P: INTRODUCTION TO MACHINE LEARNING LAB**  
(Total hours of teaching – 30 @ 02 Hrs./Week Credits 2)

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1. Statistical Analysis of any dataset using WEKA tool.
2. Analysis on various tools for machine learning and explore it.
3. Study most useful packages for machine learning and How to install packages in python.
4. Study how to download and load any datasets.
5. Study how to divide dataset into training set and testing set.
6. Create your own linear regression model in python.
7. Implement K-means Algorithm in any suitable dataset.
8. Implement Linear Regression Algorithm in any suitable dataset.

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**Core Paper - C5: INTRODUCTION TO MACHINE LEARNING**  
**(Statistical tables and Electronic Calculators are allowed)**  
**MODEL QUESTION PAPER**

Time: 3 hours

Marks: 75 marks

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks

**PART – A**

Answer any Five of the following question.

**(5X5=25M)**

<b>1</b>	
<b>2</b>	
<b>3</b>	
<b>4</b>	
<b>5</b>	
<b>6</b>	
<b>7</b>	
<b>8</b>	

**PART – B**

Answer All The Questions. Each question carries 10 marks

**(5X10= 50M)**

<b>9</b>	(A)	OR
	(B)	
<b>10</b>	(A)	OR
	(B)	
<b>11</b>	(A)	OR
	(B)	
<b>12</b>	(A)	OR
	(B)	
<b>13</b>	(A)	OR
	(B)	

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**Core Course Paper – C6: INTRODUCTION TO PYTHON PROGRAMMING**  
(Total hours of teaching – 60 @ 04 Hrs./Week Credits 3)

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**Course Objectives:**

To introduce the student to the basic features of python programming and impart skills in an Industry standard programming language

**Course Learning Outcomes:**

Upon successful completion of the course, a student will be able to:

1. Understand the concepts of python programming
2. Students should be able to develop logic for Problem Solving.
3. Students should be able to apply the problem solving skills using syntactically simple language
4. Create new GUI based programming to solve industry standard problems

**Unit-I:**

Introduction to Python - Features of Python - Executing python program using command line window and IDLE graphics window, Python Virtual Machine - Identifiers - Reserved Keywords – Variables, Comments in Python – Input , Output and Import Functions - Operators – Data Types and Operations – int, float, complex, Strings, List, Tuple, Set, Dictionary - Mutable and Immutable Objects – Data Type Conversion, Illustrative programs

**Unit-II:**

Decision Making -conditional (if), alternative (if-else), if..elif..else -nested if - Loops for, range(), while, break, continue, pass;

FUNCTIONS, ARRAYS- Fruitful functions- return values, parameters, local and global scope, function composition, recursion;

Strings: string slices, immutability, string functions and methods, string module; Python arrays, Access the Elements of an Array, array methods.

**Unit-III:**

LISTS, TUPLES, DICTIONARIES- Lists: List operations, list slices, list methods, list loop, mutability, aliasing, cloning lists, list parameters, list comprehension;

Tuples: Tuple assignment, tuple as return value, tuple comprehension;

Dictionaries: operations and methods, comprehension;

**Unit-IV:**

FILES, EXCEPTIONS, MODULES, PACKAGES- Built-in Modules - Creating Modules - Import statement - Locating modules - Namespaces and Scope - The dir() function - The reload function – Some useful Packages in Python (datetime, time, OS , calendar, math module)

Files and exception: text files, reading and writing files Renaming and Deleting files Exception handling exceptions, Exception with arguments, Raising an Exception - User defined Exceptions - Assertions in

**Unit-V:**

GUI Programming- Introduction – Tkinter Widgets – Label – Message Widget – Entry Widget – Text Widget – tk Message Box – Button Widget – Radio Button- Check Button – List box Frames – Top level Widgets – Menu Widget

**Text Books:**

1. “Taming PYTHON By Programming”, Jeeva Jose Khanna Publications
2. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist”, 2nd edition,

**Reference Books:**

1. Kenneth A. Lambert, “Fundamentals of Python: First Programs”, CENGAGE Learning, 2012.
2. Learning Python, Mark Lutz, Orielly
3. Python Programming: A Modern Approach, Vamsi Kurama, Pearson

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**Practical Paper – C6P: PYTHON PROGRAMMING LAB**  
(Total hours of teaching – 30 @ 02 Hrs./Week Credits 2)

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1. Enter the number from the user and depending on whether the number is even or odd, print out an appropriate message to the user.
2. Write a program to generate the Fibonacci series.
3. Write a program that prints out all the elements of the given list list that are less than 5.
4. Write a program that takes two lists and returns True if they have at least one common member.
5. Write a Python program to clone or copy a list
6. Write a Python program to demonstrate arrays with list comprehension
7. Write a Python script to sort (ascending and descending) a dictionary by value.
8. Write a Python program to sum all the items in a dictionary
9. Write a program with a function that accepts a string and returns number of vowels, consonants and special symbols in it.
10. Write a Python program to read an entire text file.
11. Write a Python program to append text to a file and display the text.
12. Write a program to implement exception handling.
13. Write a GUI program that converts Celsius to fahrenheit temperature using widgets

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**Core Course Paper – C6: INTRODUCTION TO PYTHON PROGRAMMING**  
**(Statistical tables and Electronic Calculators are allowed)**  
**MODEL QUESTION PAPER**

Time: 3 hours

Marks: 75 marks

**Note:** This question paper contains two parts A and B.

Part A is compulsory which carries 25 marks. Answer any five of the following questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks

**PART – A**

Answer any Five of the following question.

**(5X5=25M)**

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**PART – B**

Answer All The Questions. Each question carries 10 marks

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