



COURSE

SQL for Data Analysis (NV34007)

**VALUE ADDED
COURSE BROCHURE-30 HRS
2025-26**

ABOUT THE UNIVERSITY

Sharda University is a leading Educational institution based out of Greater Noida, Delhi NCR. A venture of the renowned Sharda Group of Institutions (SGI), The University has established itself as a high quality education provider with prime focus on holistic learning and imbibing competitive abilities in students.

The University is approved by UGC and prides itself in being the only multi-discipline campus in the NCR, spread over 63 acres and equipped with world class facilities.

Sharda University promises to become one of the India's leading universities with an acknowledged reputation for excellence in research and teaching. With its outstanding faculty, world class teaching standards, and innovative academic programs, Sharda intends to set a new benchmark in the Indian education system.

SSES combines the strengths of engineering and basic sciences to create a dynamic environment that fosters innovation and technical excellence along with a sense of social responsibility. With high-ranked programmes in engineering and robust offerings in pure and applied sciences, the school provides a comprehensive and future-ready education. The school has a legacy of excellence in the fields of Physics, Chemistry, Biochemistry, Mathematics, Data Science and Environmental Sciences.

ABOUT SCHOOL

The Sharda School of Engineering and Sciences (SSES) provides a vibrant academic ecosystem that integrates engineering and scientific education with real-world relevance, research excellence and interdisciplinary learning. It serves as a platform where students are empowered to explore, innovate and build impactful careers across a wide spectrum of disciplines.

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The academic programmes at SSES span undergraduate, postgraduate and doctoral levels and are aligned with the latest technology and scientific advancements in alliance with the NEP 2020. The school is deeply involved in academic research, industry collaboration, and consultancy projects—providing students with an exposure to both theoretical knowledge and practical applications.

ABOUT COURSE

This course provides students with a comprehensive foundation in relational database management and Structured Query Language (SQL) with a strong emphasis on applications in data science and analytics. It covers the design, querying, manipulation, and optimization of databases, enabling learners to effectively extract, clean, transform and interpret large volumes of data for decision-making in real-world scenarios. Students will gain hands-on experience with relational database systems, develop advanced SQL queries, apply data transformation and cleaning techniques, and integrate SQL workflows into analytics pipelines.

Course Schedule

Week	Content
1.	Fundamentals of DBMS & SQL Basics
2.	SQL Queries & Data Filtering for Data Science
3.	Joining, Cleaning & Transforming Data in SQL
4.	SQL for Large Datasets, Optimisation & Analytics Integration
5.	Real-World Data Science Project Using SQL

RESOURCE PERSON

Faculty Name: Dr. Sachin Singh

**Department: Department of Mathematics and Data Science, SSES
Sharda University**

Dr. Sachin has completed B.Sc. in Mathematics and Statistics from Udai Pratap Autonomous College, MGKVP, Varanasi. He has done M.Sc. and Ph.D. in Statistics from Banaras Hindu University, Varanasi. His area of research is in the field of Sampling theory. He cleared UGC-NET in 2017. He has developed a strong foundation in Sampling theory, methodology and its applications. He published several research papers in reputed journals.

1. Course Code	NV34007	
2. Course Title	SQL for Data Analysis	
3. Credits	Audit Course	
4. Mode of Examination	Practical	
5. Contact Hours	30 Hours	
Course Type	Value added course	
5. Course Objective	To equip students with the fundamental and advanced concepts of Database Management Systems (DBMS) and SQL, emphasizing their applications in data science and analytics workflows .	
6. Course Outcomes	CO1: The student will be able to describe database fundamentals, SQL structure, and relational models. (K1,K2) CO2: The student will be able to apply SQL commands for creating, inserting, updating, and deleting data. (K3) CO3: The student will be able to analyse SQL queries for data filtering, sorting, grouping, and aggregation. (K3,K4) CO4: The student will be able to implement joins, data cleaning, and transformations in SQL. (K3,K4) CO5: The student will be able to Evaluate and optimize SQL queries and integrate SQL with analytics tools. (K4,K5) CO6: The student will be able to Design and execute a real-world SQL-based analytics project. (K5,K6)	
7. Course Description	This course introduces SQL as a foundational data analysis tool in the data science domain. It covers relational databases, query writing, data cleaning, and transformation, along with advanced topics like indexing, optimization, and integration with Python or visualization tools. The course concludes with a capstone project applying SQL in real-world analytics.	
8. Outline syllabus	CO Mapping	
Unit 1	Fundamentals of DBMS & SQL Basics	
A	Introduction to DBMS – Database, DBMS – Definition, Overview of DBMS	CO1, CO2
B	Advantages of DBMS, Levels of abstraction, Data independence, DBMS Architecture, Relational vs Non-Relational; SQL overview & role in data science; Installing MySQL/PostgreSQL	CO1, CO2
C	SQL Commands: DDL, DML, DCL, TCL; Basic operations: create database, create table, alter table, drop, truncate; insert, update, delete; Simple SELECT; Primary Key, Foreign Key, Constraints; Schema & Relationships	CO1, CO2
Unit 2	SQL Queries & Data Filtering for Data Science	
A	Basic data retrieval: SELECT DISTINCT, column selection, SELECT *; Data Filtering: WHERE, BETWEEN, IN, LIKE, IS NULL	CO2
B	Comparison & Logical operators (AND, OR, NOT); Sorting & limiting results: ORDER BY, multiple column ordering, LIMIT, TOP, FETCH FIRST; Aliases & derived columns	CO2
C	Aggregate functions: COUNT(), SUM(), AVG(), MIN(), MAX(); Grouping & filtering aggregates: GROUP BY, HAVING; Difference between WHERE and HAVING	CO2, CO3
Unit 3	Joining, Cleaning & Transforming Data in SQL	
A	joins: INNER, LEFT, RIGHT, FULL, CROSS; Self joins & multi-table joins	CO3
B	Data cleaning & transformation: Removing duplicates (DISTINCT, DELETE, ROW_NUMBER()); Handling NULL values (IFNULL, COALESCE)	CO3, CO4
C	Type conversions & casting; String & Date-Time functions (CONCAT, SUBSTR, DATE_FORMAT); Data normalization & restructuring (PIVOT, UNPIVOT)	CO3, CO4
Unit 4	SQL for Large Datasets, Optimisation & Analytics Integration	
A	Overview of PL/SQL Control Structures	CO5
B	Conditional Control: IF and CASE Statements, IF-THEN Statement, IF-THEN-ELSE Statement, IF THEN-ELSE IF Statement	CO5, CO6
C	CASE Statement, Iterative Control: LOOP and EXIT Statements, WHILE-LOOP, FOR-LOOP, Sequential Control: GOTO and NULL Statements	CO5, CO6
Unit 5	Real-World Data Science Project Using SQL	
A	Group project using a real-world dataset (Sales, Health, Education, Banking, E-commerce, etc.)	CO5
B	Database design & schema creation; Data import & cleaning	CO5, CO6
C	Writing SQL queries for insights; Generating summary reports using aggregation & joins; Integrating SQL results into a dashboard (Python/Power BI/Tableau)	CO5, CO6
Mode of Examination	Assignment/Quiz/Viva	
Other Reference	<ol style="list-style-type: none"> Beaulieu, A. (2020). <i>Learning SQL: Generate, manipulate, and retrieve data</i> (3rd ed.). O'Reilly Media. Forza, B. (2019). <i>Sams teach yourself SQL in 10 minutes</i> (5th ed.). Pearson Education. <ol style="list-style-type: none"> Geeks for Geeks – <i>SQL for Data Science</i> (Primary Reference) Allen G. Taylor – <i>SQL for Dummies</i> 	