



**BISMARCK**

**TECHNOLOGY & BANKING INSTITUTION LIMITED**

Every Life, Every Moment, Every Day, A New Beginning...

**ADVANCED  
PROGRAMMING  
COURSES**

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# BISMARCK

TECHNOLOGY-LEARNING-BUSINESS-UNITES

Strong Leadership. Strong Business. Strong Future Learning.

**MySQL COURSE**

**DURATION: 2 WEEKS**

**FORMAT: WEB PDF PLUS VIDEO LECTURES**

**CERTIFICATE OF COMPLETION**

## What is MySQL?

**MySQL** is an **Open-Source** **cross-platform** **relational database management system** (RDBMS) based on **Structured Query Language (SQL)**, which is used for adding, removing, and modifying information in the database. It allows you to manage relational databases, you can also track its server logs to view your large scale needs. It is written in C and C++. It's SQL parser is written most with yacc, but it uses a homemade lexical analyzer. MySQL is supported by an many platforms. The most common one for MySQL is for the purpose of a **Web-based database**. It can be used to store any type of data from a single website or information to an entire repository or inventory of available products and services for an online shopping store.

**MySQL** is the **engine** **server** software. The **MySQL** name is a combination of two names which are "My" - name of the co-founder, Michael Widenius's daughter, and "SQL", the abbreviation in short for **Structured Query Language**.

**MySQL** is one of the most popular **Relational database management systems**. Every single day in a **MySQL** database is saved with sites, that's why it's called a **relational database**. It enables an **efficient** **storage** of website, **high-performance** and **scalable** **web-based** and even **embedded-database** applications.

**MySQL** has received many positive reviews over the years, and the reviewers has found out that it performs absolutely well in the real-world and that also the developer may have an option for support, and importantly the documentation tend to improve the many feedback in several world through Web sites, forums, communities, and the others is extremely, very good. It has also been proved and also tested to be a superior, stable and actually true multiple users, multiple threaded SQL database server.

**MySQL** is a component of the **LAMP** application software which is the abbreviation for Linux, Apache, MySQL, and PHP/Python/Perl. MySQL is robust and flexible. It used by lots of database servers with applications such as Wordpress, Joomla, Drupal, Joomla, etc. MySQL is supported by more popular web services and software, such as Facebook, LinkedIn, Twitter, YouTube, and Flickr.

Together with a scripting language such as PHP, Javascript or Perl, it is very possible to create websites and web applications, which will interact and communicate in real-time with a MySQL database to quickly and efficiently display grouped, categorized and searchable information and data to the website user.



## Features of MySQL

1. Integrated
2. Transaction safe
3. ACID-compliant (Atomic, consistent, isolation, durability)
4. Full-featured
5. Robust features
6. Crash Recovery
7. Binary-level locking
8. Self-healing replication clusters
9. Online Schema Change
10. Performance Schema for monitoring user and application-level performance
11. Fast key-value operations
12. SQL and No-SQL Access for writing complex queries
13. Platform Independence
14. Big Data Interoperability
15. Optimization
16. Replicable Views
17. Information Schema
18. Query Caching
19. Built-in replication support: Asynchronous, Semi Synchronous, Virtual Synchronous
20. HA Support
21. Transactions with save points when using it's default and internal storage engine
22. Embedded database library
23. External Support
24. Partitioned tables
25. Multiple storage engines
26. Commit grouping
27. Native storage engine
28. Custom
29. Triggers
30. Performance Schema



## Advantages of MySQL

1. The MySQL software operates in flexible.
2. Fast and Easy Access Operations.
3. Complete Workflow Control.
4. On Demand Availability.
5. Data Security.
6. Reduced Total Cost of Ownership.
7. Available under a variety of proprietary licenses.
8. Highly Performant and Scalable.
9. It gives you the ability to deploy and deploy on multiple operating systems.
10. It is easy to use and understand.

## Platforms Support for MySQL

1. AIX
2. BSD
3. FreeBSD
4. HP-UX
5. iOS/Android
6. Linux
7. OS/390
8. Linux
9. macOS
10. Microsoft Windows
11. NetBSD
12. Novell Netware
13. OpenBSD
14. OpenSolaris
15. OS/2 Warp
16. QNX
17. Oracle Solaris
18. Symbian
19. SunOS
20. VxWorks Operating
21. VxWorks Usermode
22. z/OS
23. Trustix



## MySQL as a Service

Some cloud-hosting platforms provide MySQL as a service. In this type of configuration, application owners do not have to install and also maintain the MySQL database by themselves. Instead, the database service provider takes full responsibility, control for installing and maintaining the MySQL database. Thus the application owners will have to pay for the service according to how much database resources they use. Popular cloud-based MySQL services include:

1. Amazon Relational Database Service
2. Oracle MySQL Cloud Service
3. Azure Database for MySQL
4. Backspan
5. HP Converged Cloud
6. Heroku
7. Inetia
8. Scale Grid for MySQL





## Graphical User Interfaces for MySQL

A graphical user interface (GUI) is a set of interface that allows users to visually interact with databases or even computer programs through graphical icons and visual indicators such as secondary notation. GUIs are simpler to understand and learn than the CLI (Command-Line) interfaces which always require commands and instructions to be typed on a terminal with the keyboard. There are many proprietary and proprietary free applications (or User Interfaces Front-ends) that integrate with MySQL, and enables users to work easily with database structure and data. Visually are very much available for users. Some of these popular interfaces include:

1. MySQL Workbench
2. Oracle-Cloud
3. Effortware
4. Adminer
5. Database Workbench
6. LibreOffice Base
7. DBeaver
8. HeidiSQL
9. Navicat
10. SpeedOffice.org
11. phpMyAdmin
12. Sequel Pro
13. SQLyog
14. SQL Buddy
15. Tool for MySQL
16. Watson

In the Full Course, you will learn everything you need to know about MySQL, with Certificate to decrease your knowledge.



## MySQL Course Outline

1. MySQL • Introduction
2. MySQL • Installation
3. MySQL • Administration
4. MySQL • PHP Syntax
5. MySQL • Connection
6. MySQL • Create Database
7. MySQL • Drop Database
8. MySQL • Select Database
9. MySQL • Data Types
10. MySQL • Create Tables
11. MySQL • Drop Tables
12. MySQL • Insert Query
13. MySQL • Select Query
14. MySQL • Where Clause
15. MySQL • Update Query
16. MySQL • Delete Query
17. MySQL • Like Clause
18. MySQL • Sorting Results
19. MySQL • Using Joins
20. MySQL • NULL Values
21. MySQL • Groups
22. MySQL • Transactions
23. MySQL • Alter Command
24. MySQL • Indexes
25. MySQL • Temporary Tables
26. MySQL • Clone Tables
27. MySQL • Database Info
28. MySQL • Using Replicas
29. MySQL • Handling Duplicates
30. MySQL • SQL Injection
31. MySQL • Database Export
32. MySQL • Database Import
33. MySQL • Backups and Encryption





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TECHNOLOGY-LEARNING-BUSINESS-UNITES

Strong Learning. Smarter Learning. Better Learning.

## MySQL COURSE

DURATION: 2 WEEKS

FORMAT: WEBPDF PLUS VIDEO LECTURES

CERTIFICATE OF COMPLETION

## What is MySQL?

MySQL is an Oracle-backed open-source relational database management system (RDBMS) based on Structured Query Language (SQL), which is used for adding, removing, and modifying information in the database. It allows you to manage relational databases, you can also create the master code to suit your large scale needs. It is written in C and C++. It's SQL, perfect to write most web sites, but it uses a somewhat logical analyzer. MySQL is supported by so many platforms. The most common use for MySQL is for the purpose of a Web-based database. It can be used to store any type of data from a single record of information, due to its master topology or inventory of available products and services for an online shopping store.

MySQL is free and open-source software. The MySQL name is a combination of two names which are "My" - name of the co-founder - Michael Widenius's daughter; and "SQL", the abbreviation or short form of Structured Query Language.

MySQL is one of the most popular Relational database management systems. Every single data in a MySQL database is stored with tables, that's why its called a relational database. It enables cost-effective solution of reliable, high-performing and scalable web-based and even embedded database applications.

MySQL has received many positive reviews over the years, and the software has found out that it performs absolutely well in its medium case? and that also the developer interface is user friendly support, and importantly the documentation just to mention the many free books in the real world through Web sites, forums, communities, and the latest is extremely, very good. It has also been purchased and also tested in a couple of, reliable and actually free multiple users, multiple-threaded SQL database server.

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Together with a scripting language such as PERL, Javascript or PHP, it is very possible to create websites and web-applications which will interact and communicate in real-time with a MySQL database to quickly and efficiently display grouped, categorized and searchable information and data to the website user.



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9. Online Schema Change
10. Performance Schema for monitoring user and application-level performance
11. Fast key-value operations
12. SQL and No-SQL Access for writing complex queries
13. Platform Independence
14. Big Data Interoperability
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16. Replicable Views
17. Information Schema
18. Query Caching
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9. It gives greater ability to deploy and deploy on multiple operating systems.
10. It is easy to use and understand.

## Platform Support for MySQL

1. iOS
2. MacOS
3. FreeBSD
4. HP-UX
5. AIX/PowerPC
6. z/OS
7. IBM OS/390
8. Linux
9. macOS
10. Microsoft Windows
11. NetBSD
12. Novell Netware
13. OpenBSD
14. OpenSolaris
15. OS/2 Warp
16. OS/390
17. Oracle Solaris
18. Symbian
19. SunOS
20. VxWorks OpenVMS
21. VxWorks Unikware
22. Xenix
23. Tru64



## MySQL as a Service

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1. MySQL Workbench
2. Oracle-Cloud
3. Effortware
4. Adminer
5. Database Workbench
6. LibreOffice Base
7. DBeaver
8. HeidiSQL
9. Navicat
10. SpeedOffice.org
11. phpMyAdmin
12. Sequel Pro
13. MySQL
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15. Tool for MySQL
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3. MySQL • Administration
4. MySQL • PHP Syntax
5. MySQL • Comments
6. MySQL • Create Database
7. MySQL • Drop Database
8. MySQL • Select Database
9. MySQL • Data Types
10. MySQL • Create Tables
11. MySQL • Drop Tables
12. MySQL • Insert Query
13. MySQL • Select Query
14. MySQL • Where Clause
15. MySQL • Update Query
16. MySQL • Delete Query
17. MySQL • Like Clause
18. MySQL • Grouping Records
19. MySQL • Using Join
20. MySQL • M.D. Values
21. MySQL • Groups
22. MySQL • Transactions
23. MySQL • Alter Command
24. MySQL • Indexes
25. MySQL • Temporary Tables
26. MySQL • View Tables
27. MySQL • Database Info
28. MySQL • Using Replicas
29. MySQL • Handling Duplicates
30. MySQL • SQL Injection
31. MySQL • Database Export
32. MySQL • Database Import
33. MySQL • Exams and Certification





**BISMARCK**

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**ORACLE 11 G – DATABASE ADMIN COURSE**

**DURATION: 2 WEEKS**

**FORMAT: WEBPDF PLUS VIDEO LECTURES**

**CERTIFICATE OF COMPLETION**

## What is Oracle Database?

**Oracle Database** is a proprietary multi-model object-oriented relational DBMS • Database Management System (produced and marketed by Oracle Corporation).

## Oracle Database Releases and Versions

There are various versions or generations of the object-oriented relational database management system developed by Oracle Corporation since inception in 1977.

They are as follows:

Oracle v1 • Released in 1977

Oracle v2 • Released in 1979

Oracle v3 • Released in 1982

Oracle v4 • Released in 1984

Oracle v5 • 1 983 Release

Oracle v6 • 1 983 Release

Oracle 6.5

Oracle 7 • 1990

Oracle 7.1 • 1994

Oracle 7.2 • 1994

Oracle 7.3 • 1994

Oracle 8 • 1997

Oracle9i • 1999

Oracle9i • 2000

Oracle9i Release 2 • 2002

Oracle Database 10g Release 1 • 2003

Oracle Database 10g Release 2 • 2004

Oracle Database 11g Release 1 • 2007

Oracle Database 11g Release 2 • 2009

Oracle Database 12c Release 1 • 2013

Oracle Database 12c Release 2 • 2014/2017

Oracle Database 18c • 2018

Oracle Database 19c • 2019

The latest version or generation of Oracle Database as at 2019 is the Oracle Database 19c, which is available on-premise, on-Cloud, and on hybrid-Cloud environment. In the year-2017, The Executive-Chairman of the Board and CEO, Larry Ellison announced the new database generation which is referred to Oracle Autonomous Database (a-OpenSource) Sun Platform.



## Advantages of Oracle Database 12c

1. Oracle Database offers active data guard.
2. Oracle Database offers advanced analytics.
3. It provides advanced compression.
4. It offers advanced security.
5. It provides database in-memory.
6. It provides database vault.
7. It offers time-series application via database vault.
8. It offers label security.
9. It offers management packs.
10. It provides multitenant.
11. It offers Online Analytical Processing known as OLP, OPA.
12. It offers partitioning.
13. It provides real application clusters.
14. It offers real application testing.
15. It comes with Spatial and Graph.
16. Provides data consistency and consistency.
17. It offers advanced data storage structure.
18. It creates job opportunity.



## Features of Oracle Database

1. Data Consistency and Integrity
2. Scalability
3. Backup and Recovery
4. Business Intelligence
5. High Availability
6. Grid Logic Database (GLDB)
7. Content Management
8. Database Security
9. Data Integrity
10. Triggers
11. Information Integration

In the Full Course, you will learn everything you need to know about Oracle Database with the illustration of Completion to increase your knowledge.



## Oracle 11G Database Course Outline

- Oracle 11G Database • Introduction
- Oracle 11G Database • Tables and Table Clusters
- Oracle 11G Database • Indexes and Index-Organized Tables
- Oracle 11G Database • Partitions, Views, and Other Tables Objects
- Oracle 11G Database • Overview of Partitions
- Oracle 11G Database • Data Integrity
- Oracle 11G Database • Data Dictionary and Dynamic Performance Views
- Oracle 11G Database • SQL
- Oracle 11G Database • Server-Side Programming (PL/SQL) and Java
- Oracle 11G Database • Data Consistency and Consistency
- Oracle 11G Database • Transactions
- Oracle 11G Database • Physical Storage Structures
- Oracle 11G Database • Logical Storage Structures
- Oracle 11G Database • Oracle Database Instances
- Oracle 11G Database • Memory Architecture
- Oracle 11G Database • Process Architecture
- Oracle 11G Database • Application and Networking Architecture
- Oracle 11G Database • Database Administrators and Developers
- Oracle 11G Database • Concepts for Database Administrators
- Oracle 11G Database • Concepts for Database Developers
- Oracle 11G Database • Oracle 11G Video Training
- Oracle 11G Database • Exams and Certification





# BISMARCK

TECHNOLOGY-LEARNING INSTITUTE

Helping Learning become Learning, More Learning

## SQL DATABASE COURSE

DURATION: 3 WEEKS

FORMAT: WEB/PDF PLUS VIDEO LECTURES

CERTIFICATE OF COMPLETION

## What is SQL?

**SQL (Structural Query Language)**, pronounced as "sequel" is a domain-specific language that is used in programming which is designed to be used to manage data within a relational database management system (RDBMS). It can also be used for various processing in a relational data source management system (RDBMS). SQL is especially useful in handling structured data, for example, data organizing relations among different entities and variables.

**SQL provides two major sub-languages over previous ones.** For example, APIs such as FOXPRO or dBASE. It initially introduced the concept of accessing many records with one unique row, record. Thus, it introduced the need to specify how to reach a data record, e.g. with or without an index.

**SQL is primarily based upon relational algebra and calculus that are strictly relational.** SQL is made up of many types of statements, which may be informally categorized as sub-languages, namely, **select query language (SQL), data definition language (DDL), data manipulation language (DML) and data control language (DCL).**

**The scope of SQL comprises of data query, data manipulation (eg. insert, update and delete), data definition (to build new, the creation and modification of database schema), and data access control.** Although SQL is primarily a declarative language (DCL), it also includes procedural elements.





## Components of SQL

**1. Data Definition Language:** The Data Definition Language (DDL) contains commands that are less frequently used. DDL commands modify the actual structure of a database, rather than the database's contents. Examples of commands used DDL commands include those used to generate a new database table (CREATE TABLE), modify the structure of a database table (ALTER TABLE), and delete a database table (DROP TABLE).

**2. Data Manipulation Language:** The data manipulation DML commands retrieve information from a database (the SELECT command), add new information to a database (the INSERT command), modify information currently stored in a database (the UPDATE command), and remove information from a database (the DELETE command). It contains the subset of SQL commands used most frequently — those that simply manipulate the contents of a database in some form.

**3. Data Control Language:** The Data Control Language (DCL) is used to manage user access to databases. It consists of two commands: the GRANT command, used to add data base permissions for users, and the REVOKE command, used to remove existing permissions. These two commands form the core of the relational database security model.

**4. Query Language:** The query language is also a part of DML, and is used to retrieve data from a table using select command and other key commands.

**5. Transaction Control Language:** Transactional statements include commit, rollback and save points. The system control statement is used to change session-level parameters, like default date format and numeric format. The system control statements are used to change system-wide parameters, like memory allocation.



## Features and Characteristics of SQL

1. **High Performance:** SQL programming provides high-performance programming capability for extremely transactional, complicated heavy workload and high usage database systems. SQL programming permits various ways to describe your data more accurately.

2. **High Availability:** SQL is compatible with various databases like Microsoft SQL Server, MS Access, MySQL, Oracle Database, IBM Adaptive Server, SAP R/3DB, etc. All of these relational database management systems have support for SQL and it is very easy to develop an application extension for procedural programming and various other functions which are added features, therefore, converting SQL into a very powerful tool.

3. **Scalability and Flexibility:** SQL provides Flexibility and Scalability. It is very easy to create new tables and previously created stored tables can be dropped or deleted in the database.

4. **Robust Transactional Support:** With SQL programming can handle large amounts of data and manage various transactions.

5. **High Security:** It is very easy to implement permissions, variables, procedures, and views therefore SQL gives security to your data.

6. **Empowerment in Application Development:** SQL is used by many software developers to develop apps that access databases. The main reason for the rise of an organization or bank, mostly, SQL works for every small or large organization.

7. **Management Ease:** SQL is used in almost every relational database management system, and it provides common commands that help to manage large amounts of data from a database very quickly and efficiently.

8. **Open Source:** SQL is an open-source programming language for developing a relational database management system.



## Benefits and Advantages of SQL

**1. High speed:** Using the SQL queries, the software developer can efficiently and quickly retrieve a large number of records from a database.

**2. No coding needed:** In conventional SQL, it is very easy to manage the database system. It does not expect a large amount of code to manage the database system.

**3. Well defined standards:** Long established standards that are used by the SQL databases are also used by ODBC and JDBC.

**4. Portability:** SQL can be used in PCs, laptops, servers and even on some mobile phones.

**5. Interactive language:** SQL is a domain language that is used to interact with the database. It is also used to execute relatively complex queries in seconds.

**6. Multiple-data view:** Using the SQL language, the developer can make different views of the structure of the database.



## Why Study SQL?

**1. Data Mining:** Using basic queries you can identify specific data of your interests, store update records, monitor table activity, and much more.

**2. High Demand:** You should always be problem-solving a job as an SQL programmer. There are more SQL programming jobs than any other type of programming language.

**3. Data Manipulation:** SQL is particularly efficient at data manipulation, because it allows you to see the exact data and how it works, you'll have an easier time testing and manipulating the data.

**4. Business Skill Set:** If you plan on managing servers or creating your own server, SQL programming language will most certainly prove useful.

**5. Increase Your Earning Potential**

**6. Job Opportunities and Career Advancement**





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UNIVERSITY  
Bismarck, North Dakota

## POSTGRESQL COURSE

**DURATION: 2 WEEKS**

**FORMAT: WEBPDF PLUS VIDEO LECTURES**

**CERTIFICATE OF COMPLETION**

## What is PostgreSQL?

PostgreSQL is an all-purpose, self-object-relational database management system, and it is the most advanced open-source database system. PostgreSQL was developed initially based on POSTGRES 4.2 at the Berkeley Computer Science department at the University of California.

PostgreSQL was designed and developed to run on UNIX-like systems. Nevertheless, PostgreSQL was then also developed to be portable so that it could work on several other platforms such as Solaris, Mac OS X, and Windows.

PostgreSQL is free and open-source computer software. Its source code is made available under the PostgreSQL License, which is a liberalized open-source license. You can modify, use, modify and distribute PostgreSQL in any form that you feel.

PostgreSQL requires very little effort to maintain because of its stability. Therefore, if you build a software application that is based on PostgreSQL, the entire cost of ownership is very low when compared to other relational database management systems.

PostgreSQL is the first database management system that completely implements a multi-version concurrency control (MVCC) feature, even before Oracle. The MVCC feature in PostgreSQL eliminates the complex isolation methods.

PostgreSQL is an all-purpose self-object-relational database management system. It lets you include custom functions that are developed with various programming languages such as Java, C/C++, etc.

PostgreSQL was developed to be modular and extensible. In PostgreSQL, you can define your own datatypes, functional languages, index types, etc. If you don't like any part of the system, you can always develop a custom plugin to further enhance it to meet your requirements, for example, adding more operators.



## Why PostgreSQL?

- 1. Extensibility:** With Postgres, we have access to lots of extensions that will enable new ways to process data right from the database. Using extensions like PostGIS, where you can implement geospatial joins and get exactly the data you need for an urban planning problem requires being smart about database location data usage. PostgreSQL supports different kinds of techniques for geospatial data storage such as PostGIS, Kudu, and H3Link.
- 2. Compatibility:** Like Postgres, to achieve consistency in your database, it is versatile in terms of architecture (RDBMS, System-of-Records, OLTP) and also OLAP, Analytics, Data Science, and is powerful in terms of computation.
- 3. Licensing:** Postgres is released as Open Source Software. There is enough ready-to-build Postgres. The project infrastructure is also contributed to in the Open Source way, and you can read a patch to the Postgres website. Better to fix a problem for non-commercial work.
- 4. Flexibility (SQL):** Functions called "Stored Procedures" can be used for various environments. Also, we support languages similar to PL/SQL in Oracle such as PL/pgSQL, PL/Python, PL/Perl, C/C++, and PL/R.
- 5. Acid And Transparency:** PostgreSQL supports ACID Atomicity, Consistency, Isolation, Durability).
- 6. Replication:** PostgreSQL supports a variety of replication methods such as Streaming Replication, Sharding, and mirroring.
- 7. Indexing:** PostgreSQL not only provides B+ tree index techniques, but various kinds of techniques such as GIN Generalized Inverted Index, and GIST Generalized Search Tree, etc as well.
- 8. Full-Text Search:** Full-Text search is available when searching for strings with the various form of vector operation and string search.



## Features of PostgreSQL

There are many features of PostgreSQL, and some of them are:

1. PostgreSQL is compatible with several platforms by using all major compilers and languages.
2. PostgreSQL offers a very strong and sophisticated testing mechanism.
3. PostgreSQL Support for multi-version concurrency control.
4. PostgreSQL allows for a more efficient Server-Side Programming Functionality.
5. PostgreSQL is compliant with the ANSI SQL standard.
6. PostgreSQL offers full support for the client to server network architecture.
7. PostgreSQL has both Log-based and trigger-based replication SQL features.
8. PostgreSQL has a standby server and a high availability feature.
9. PostgreSQL is compatible with Object-oriented and ANSI SQL:2003.
10. PostgreSQL offers support for JSON and it allows you to link with other data stores like MongoDB, which works as a federated link for multiquery-database systems.





## Benefits of PostgreSQL

There are many benefits of PostgreSQL, and some of them are:

1. PostgreSQL can be installed on dynamic modules and wrappers as an option in the LAMP stack.
2. PostgreSQL's relational logging feature makes it be a highly fault-tolerant database.
3. The source code of PostgreSQL is made freely available under an open-source license. This allows you the freedom to modify, use, and implement it as per your business requirements.
4. PostgreSQL supports other geographic objects as it can be used as a geospatial database for location-based data services and geographic information systems.
5. PostgreSQL supports geographic objects as it can be used as a geospatial database for location-based data services and geographic information systems.
6. To learn PostgreSQL, you don't need much training since PostgreSQL is very easy to use.
7. PostgreSQL has a low cost of maintenance for both embedded and enterprise use.

## Why Study PostgreSQL?

1. Be the Expert in Database: Studying PostgreSQL helps you increase your knowledge and skills in administering databases.
2. Job Opportunity and Career Advancement.
3. Increase Your Earning Potential.
4. Transferable Skill.
5. It's free, open, and unlimited.





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**PLISOL COURSE**

**DURATION: 2 WEEKS**

**FORMAT: WEBPDF PLUS VIDEO LECTURES**

**CERTIFICATE OF COMPLETION**

## What is PL/SQL?

**PL/SQL** is an extension of SQL, which is the acronym for Structured Query Language that is utilized in Oracle. Unlike SQL, PL/SQL lets the software programmer write their code in a procedural format. The full name of PL/SQL is “Procedural Language extensions to SQL”.

**PL/SQL** joins together the data-manipulation power that is present in SQL with the processing power that is made possible with procedural languages to create a super-powered SQL query. PL/SQL involves instructing the computer on ‘what to do’ with SQL, and how to do it through its procedural design way. Similar to other database languages, PL/SQL offers more control to the software programmers by the use of conditions, loops and object-oriented concepts.

**PL/SQL** consists of SQL, alongside the procedural techniques of programming languages. It was made by Oracle Corporation in the 70s to boost the current capabilities of SQL.

**PL/SQL** is one of the three main programming languages placed in the Oracle Database, including SQL, Java and Java. This certification course will give you great understanding of PL/SQL to proceed with the Oracle database and other advanced RDBMS concepts.

**All the statements that are in a statement block are executed in the order in which all of the same lines which further increase the speed of processing and takes down the traffic load on the server.**

**PL/SQL** is a mixture of SQL, together with the procedural features of software programming languages. It was developed by the Oracle Corporation in the early 70s to improve the features and capabilities of SQL. PL/SQL is one of three fundamental programming languages that are embedded in the Oracle Database, along with SQL, Java and Java.



## Features of PL/SQL

There are many features of PL/SQL, and some of them are:

1. PL/SQL is essentially a procedural language, which equips you with the functionality of iteration, decision making, and many more features that are present in procedural software programming languages.
2. PL/SQL can run a number of database queries in one statement/block by using a single command.
3. One can design a PL/SQL unit with functions, procedures, triggers, packages, and types, that are stored in the database to be used by other applications.
4. PL/SQL presents you with features to handle the exception that occurs in PL/SQL. Much better as the exception handling block.
5. Applications that are written in PL/SQL are portable and portable to compute hardware or operating system where Oracle is operational.

## Notable Facts on PL/SQL

1. PL/SQL is a very portable, high-performance, querying, interactive programming language.
2. PL/SQL gives a built-in integrated and platform-independent programming IDE.
3. PL/SQL can also easily be called from the command-line SQL\*Plus interface.
4. The direct request can also be made from procedural programming language calls to the database.
5. PL/SQL, in general, is inspired by that of COBOL and Pascal programming languages.
6. Inside Oracle, PL/SQL is available in TimesTen, memory database and IBM DB2.



## Benefits of PL/SQL

There are many benefits of PL/SQL, and some of them are:

1. SQL is the conventional database language and PL/SQL is fully integrated with SQL. PL/SQL offers support for both static and dynamic SQL operations. Static SQL allows you just for DDL operations and transaction control from the PL/SQL block. In dynamic SQL, SQL lets you embed SQL statements into your PL/SQL blocks.
2. PL/SQL allows you to send an entire block of statements to the database at one time. This takes down throughput traffic and gives you a very high-performance rate for your applications.
3. PL/SQL provides high productivity to software programmers as they can transform, query, and update data in a database.
4. PL/SQL saves you the time that is spent in designing and debugging by implementing powerful features, such as encapsulation, exception handling, data binding, and object-oriented data types.
5. Applications that are written in PL/SQL are completely modular and portable.
6. PL/SQL offers you a high security level for your application.
7. Learning PL/SQL helps you a high paying job as PL/SQL skilled individuals are highly valued ones.
8. Much Better Performance
9. PL/SQL has pretty tight integration with SQL.
10. PL/SQL offers full portability
11. PL/SQL has high support for Object-oriented programming.



## PL/SQL: About

- This is the component that has the main PL/SQL code [\[1\]](#)
- This composition of various parts is separated into code logically independent sections for defining purposes, execution sections for processing statements, exception handling section for handling errors [\[2\]](#)
- Structures the SQL code that used to communicate with the database server [\[3\]](#)
- All the PL/SQL units are taken as PL/SQL blocks, and this is the initial stage of the work item which operates as the primary input [\[4\]](#)

The following are the various types of PL/SQL routines.

- Anonymous Block [\[5\]](#)
- Block [\[6\]](#)
- Procedure [\[7\]](#)
- Package Body [\[8\]](#)
- Package Specification [\[9\]](#)
- Trigger [\[10\]](#)
- Type [\[11\]](#)
- Type Body [\[12\]](#)

## PL/SQL: Engine

- PL/SQL engine decomposes PL/SQL units and the SQL section in the input.
- The decomposed PL/SQL units will be worked out by the PL/SQL code engine itself [\[13\]](#)
- The SQL part will be sent to the database server where the actual interaction with the data base takes place [\[14\]](#)
- It can be installed in both the database server and in the application server [\[15\]](#)



## Database Server

- This is the most significant component of the PL/SQL, unit which stores the data (2)
- The PL/SQL engine makes use of the SQL from PL/SQL, unit to communicate with the main database server (2)
- Execution of SQL, executes which process the input SQL statements and executes the result.

## PL/SQL Special Characters / Delimiters

A delimiter is a very simple or compound character that has a unique and special meaning to a particular programming language. In PL/SQL, they include:

### Delimiters/Description

+, *, %, /	• Addition, subtraction/negative, multiplication, division
%	• Modulus indicator
'	• Character string delimiter
.	• Component selector
()	• Expression or list delimiter
:	• Host variable indicator
~	• Row operator
@"	• Quoted identifier delimiter
@	• Relational operator
	• String concatenation indicator
:	• Statement terminator
	• Alignment operator
	• Association operator
	• Concatenation operator
	• Exponentiation operator
,	• Label delimiter (begin and end)
,	• Multiple comment delimiter (begin and end)
	• Single-line comment indicator
	• Range operator
,    ,    ,	• Relational operators
,    ,    ,	• A different version of NOT EQUAL



## Why Study PL/SQL?

1. PL/SQL lets you send an entire/bulk of statements to the database once. This helps to reduce network traffic thereby making you develop applications that are much faster.
2. PL/SQL has high support for object-oriented programming.
3. Knowledge of PL/SQL helps you to get a high-paying job as PL/SQL skilled individuals are highly valued often.
4. Job opportunities and career advancement.

## PL/SQL Course Outline

- PL/SQL • Introduction
- PL/SQL • Overview
- PL/SQL • Environment
- PL/SQL • Basic Syntax
- PL/SQL • Data Types
- PL/SQL • Variables
- PL/SQL • Constants and Literals
- PL/SQL • Operators
- PL/SQL • Conditions
- PL/SQL • Loops
- PL/SQL • Strings
- PL/SQL • Arrays
- PL/SQL • Procedures
- PL/SQL • Functions
- PL/SQL • Cursors
- PL/SQL • Records
- PL/SQL • Exceptions
- PL/SQL • Triggers
- PL/SQL • Packages
- PL/SQL • Collections
- PL/SQL • Transactions
- PL/SQL • Date & Time
- PL/SQL • BMS4-Output
- PL/SQL • Object Oriented
- PL/SQL • Video Lectures
- PL/SQL • Exams and Certification







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**DBMS COURSE**

**DURATION: 2 WEEKS**

**FORMAT: WEB/PDF PLUS VIDEO LECTURES**

**CERTIFICATE OF COMPLETION**

## What is DBMS?

DBMS is acronym for Database Management System and it is a software program used for storing and retrieving user's data by considering appropriate storage structure and security measures. The word 'database' is defined as the collection and assembling of electronic records that can be processed to produce useful information. The Data in DBMS can be read, modified, controlled, managed and organized to perform different types of data processing activities. The data are usually stored and numbered across rows, columns, variables all of which make the workflow of processing and querying of data more efficient.

## Types of DBMS

There are different types of database, and some of them are:

1. Object-oriented
2. Relational
3. Hierarchical
4. Network
5. Distributed and others

In a Full-blown enterprise application, manipulation of databases involves extensive, efficient, security, variables and compliance-focused records of items that all have complicated logical relationships with the other database and it grows rapidly as time goes by and as the user base increases. As a result, these organizations need a technological solution to manage, maintain, process and store the data in the database, in this situation, a database management system comes to use because it allows users to create their own database judging by their requirements. It is made up of a group of computer programs that manipulate the database and it provides a means to the database. The DBMS takes in a request for the data from an application and then sends commands to the operating system to come up with the specific data.



## Features of DBMS

In order to work properly, a DBMS software needs the following features:

**Data:** DBMS needs data to operate, and it also needs access to database records individually to insert and delete functions. These data could include files like a dictionary of data representing data flows, customers in business, staff in an organization, students in a school, relationships/related records or objects.

**Software:** A DBMS is basically a system software program that can be classified as a data management tool or a means to communicating with, and manage databases. The link also extends across 'real-world' physical systems that generate data to the functional databases. The Operating system, hardware infrastructure, and networking capabilities are all involved in processing, storing, managing and protecting databases.

**Query processor:** The query processor, being one of the basic components of the DBMS, functions as a direct link between users and the DBMS-data engine to send query requests. When a user issues an instruction in a structured query language, the command is converted from the high-level language/instructions to a low-level language that the computer can understand and process to perform the correct DBMS functionality; aside from just parsing and translating, the query processor also carries out processing and executes functionality optimizing the queries.

**Database Languages:** Database languages are the features of a database management system that insert, modify, view and retrieve data from the database. The types of DBMS languages include: Data Definition Language (DDL), Database Access Language (DALL), Database Manipulation Language (DML) and Data Control Language.

**Reporting:** Reporting is a useful feature of a DBMS software because it extracts useful information from database files and displays it in an arranged format based on the user-defined specifications. This information is useful because it can be used for later analysis, decision-making or business intelligence.

**Database Engine:** A database engine is a fundamental component within the DBMS software solution that carries out the mechanics of data storage and retrieval.



## Benefits and Advantages of DBMS

Below are some of the benefits and advantages of using a DBMS system

- DBMS Reduces Data Redundancy
- DBMS offers Sharing of Data
- DBMS offers Privacy
- It offers Data Security
- Easy Backup and Recovery of Data
- Search Capability
- Simplicity of Use
- Data Migration
- DBMS Serves Enterprise and Individual Data
- Storage Requirements
- Powerful User Language
- Cost of Maintenance is Lower
- Very Less Chances of Losing data
- DBMS is Consistent
- DBMS Saves Time
- Easy Retrieval of Data

## Major Components of DBMS

There are four major components of DBMS, they are:  
Users, Software, Hardware and Data.

Users: Consist of Database Designers, Database Administrators and the End-Users.  
a. Database Designers: are the individuals who actually work on developing the database.  
b. Database Administrators: are the individuals in charge of maintaining and administering a DBMS.  
c. End-Users: they are individuals who use the product after it has been fully developed.

**Software:** This controls the application Storage Management and Retrieval of Data. Example of database software includes ORACLE, SQL.

**Hardware:** The hardware coverage from PC to network components, and it also includes storage devices such as hard-disk and input/output devices such as monitor and printer.

**Data:** Data stored includes both commercial and non-commercial data.



## DBMS Study

In the Fall Course, you will learn everything you need to know about DBMS with Certification to increase your knowledge and competence.

## DBMS Course Outline

- DBMS • Introduction/Overview
- DBMS • Architecture
- DBMS • Data Models
- DBMS • Data Dictionary
- DBMS • Data Independence
- DBMS • ER Model Basic Concepts
- DBMS • ER Diagram Representation
- DBMS • Generalization, Aggregation
- DBMS • Data's Roles
- DBMS • Relational Data Model
- DBMS • Relational Algebra
- DBMS • ER to Relational Model
- DBMS • SQL
- DBMS • Database Normalization
- DBMS • Database Index
- DBMS • Storage System
- DBMS • File Structure
- DBMS • Archiving
- DBMS • Backup
- DBMS • Transaction
- DBMS • Concurrency Control
- DBMS • Deadlock
- DBMS • Data Backup
- DBMS • Data Recovery
- DBMS • Midis Lectures
- DBMS • Exams and Certification





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## **ORIENTOR COURSE**

**DURATION: 2 WEEKS**

**FORMAT: WEBPDF PLUS VIDEO LECTURES**

**CERTIFICATE OF COMPLETION**

## What is OrientDB?

**OrientDB** is an open-source NoSQL database management system that is developed with Java. It is a database that has a Multi-model and offers support for representing graphs, object models, and documents, key-values, but the relationships are handled as in graph-databases with direct connections between the records. OrientDB offers support for schemas-full, schema-less, and schema-mixed modes. It has a strong security profiling system that is based on users and roles and it has support for querying with Cypher along with SQL extended for graph traversal.

**OrientDB** makes use of several indexing strategies and mechanisms that are based on B-tree and B+tree-like indexing, the last one is referred to as "B-tree index", there are other plans on being able to use LSH-like and Fractal tree-index that is based on indexes. Each record in orient DB has a **unique key** that is used to indicate the position of a record inside of an Array list, index that includes the records are stored either as a single value of records or a position stored inside of the values or as **array** of record-positions referred to as record IDs (RID's) which allows for fast traversal (with O(1) complexity) of one-to-many relationships and for fast addition/removal of new links. OrientDB is was named the third most popular graph database according to the DB-Engines graph database ranking, as of August 2017.

The development of OrientDB will depend on an open-source community that is led by the OrientDB LTD company which was created by its original author Luca Garulli. The project makes use of GitHub to manage the sources, contributions and file versioning. It also uses Google Group and Stack-Overflow to offer free support to global users. OrientDB also has a lot of Big-Data community and those who are hoping to learn the basics and get started with using OrientDB.



## Features of OrientDB

**1. Transactions:** Supports ACID transactions, as well as atomic operations, guaranteeing that all database transactions are processed reliably, and in the event of a critical pending save, users are notified and committed. Managing document databases is done with speed with logs data included. It wouldn't matter how much data needs to be worked on. Other data, however, graph providers may slow down due to their computing techniques otherwise for every single query with OrientDB processing speed is not affected, even if working with billions of records.

**2. Query Language:** Query language is built on SQL. Supports SQL queries with `create`, `insert`, to handle relationships without SQL, `join`, `merge` `where`, and `graph` of connected documents.

**3. Storage Engines:** Uses the storage engine name `LOCAL` and `PLURAL`.

**4. Indexes:** Supports three different indexing algorithms so that the user can achieve the best performance.

**5. Security:** Security features introduced in OrientDB 2.7 provide an extensible framework for adding external authentication, password validation, LDAP support of database roles and more, advanced auditing capabilities, and finally supports OrientDB Enterprise Edition provides features: password authentication for browser SPIN, it supports. When it comes to database encryption, starting with version 3.1, OrientDB can encrypt records on disk. This process unauthenticated users from accessing database content or even from bypassing the audit security.

**6. Importer:** allows relational databases to be quickly imported into OrientDB in few simple steps.

**7. Multi-model database:** It supports different models like Documents, Graph, Key/Value, and Full Object. OrientDB contains a separate API to support all these four models.

**8. Graph database:** Native management of graphs. Fully compliant with the Apache TinkerPop framework (previously known as GraphLab open source) graph computing framework.

**9. Relationships:** Embeds and connects documents like relational databases. From direct, hyper-link links taken from the graph database world.

**10. Full Text:** Easily creates a complete graph with interconnected documents. **11. Cloud Support:** OrientDB can be deployed in the cloud and supports the following providers: Amazon Web Services, Microsoft Azure, CenturyLink Cloud, SoftLayer, DigitalOcean.





## Benefits of Oracle®

- 1. Fast Operations:** Oracle® has been designed and developed to deliver high performance. It supports fast read and write processes. For writes, Oracle® can fast up to 100MB records per second. Its fast-write columnar models can add 1 TBMM records each second while ensuring that the rest of the time graph is correct for real-time analysis.
- 2. High-Speed for All Your Needs:** It can be very expensive to change your current DBMS if you require it. Oracle® is the solution as it also allows the need to be met in various applications for your purposes.
- 3. Easy-to-Implement:** Oracle® supports a multi-master plus shared architecture, which means that all the servers are master servers. This provides both reliability and high read availability. The program can work on any platform without any installation and configuration. You can use it as a drop-in replacement for the common graph databases that are deployed today. The full user distribution is around two megabytes and including the demo database.
- 4. Flexible and Robust Solution:** Oracle® is very flexible and robust enough to be employed as an operational DBMS. It does not require a restart or downtime for its maintenance, and it makes use of the free space which is generally stored across while writing.
- 5. Provides More Flexibility and Functionality:** Oracle® is a leading NoSQL solution. It offers greater flexibility and functionality than its competitors and it is robust enough to be used in place of your operational DBMS.

## Why Study Oracle®?

1. Learn the differences between Relational and Graph models
2. Build flexible Graph and Document data models
3. Increase Your Learning Potential
4. Career Opportunities and Advancement
5. Job Opportunities and Career Advancement.



## DelouDB Course Outline

- DelouDB • Home
- DelouDB • Overview
- DelouDB • Installation
- DelouDB • Basic Concepts
- DelouDB • Data Types
- DelouDB • Create Modes
- DelouDB • Create Database
- DelouDB • Export Database
- DelouDB • Import Database
- DelouDB • Connect Database
- DelouDB • Rollback Database
- DelouDB • Restore Database
- DelouDB • Drop Database
- DelouDB • Backup Commands
- DelouDB • Clone Commands
- DelouDB • Cluster Commands
- DelouDB • Property Commands
- DelouDB • Merge Commands
- DelouDB • Edge Commands
- DelouDB • Advanced Concepts
- DelouDB • Interfaces
- DelouDB • Video Lectures
- DelouDB • Exams and Certification





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**MS SQL SERVER COURSE**

**DURATION: 2 WEEKS**

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**CERTIFICATE OF COMPLETION**

## What is MS SQL Server?

**MS SQL Server** is a relational-database management system (RDBMS) that was developed and is managed by Microsoft. This product is developed for the basic function of storing and retrieving data as required by other software applications. It can be either run on the same computer as an another computer across a network.

**MS SQL Server** buffers pages in the computer RAM to minimize disk input and output. Any 8-Kilobyte page can be buffered in the main and the group of all the pages that are currently buffered is referred to as the buffer cache. The amount of memory that is made available to the SQL Server decides how many pages will be cached in the memory. The buffer cache is handled and managed by the Buffer Manager. Either writing to or reading from any page copies the data to the buffer cache. Subsequent reads or writes are forwarded to the in-memory copy, rather than the version that is on-disk. The page is then updated on the storage medium by the Buffer Manager only if the in-memory cache has not been refreshed for a while. While writing data on the page/back to-disk, simultaneous input and output are used whereby the I/O operation is carried out in a background thread so that other operations do not have to wait for the input/output operation to be completed.

**MS SQL Server** allows several clients to make use of the same database resource simultaneously. As such, it needs to manage and control the concurrent access to the shared data, to make sure of the data integrity when multiple clients update the same data, or when clients attempt to read the data that is in the process of being modified by another client. MS SQL Server presents developers with two ways of concurrency control which are optimistic concurrency and pessimistic concurrency. When pessimistic concurrency control is being used, SQL Server manages and controls the concurrent access by using locks. Locks can be either shared or held exclusively. Exclusive lock prevents the users with exclusive access to the data, no other user can have access to the data as long as the lock is on. Shared locks are made used when some data is being read multiple users can read from data that is locked with a shared lock but not locked with an exclusive lock. The data that is held with an exclusive lock would have to wait for all the shared locks to be terminated.



## Components of MS SQL Server

The Microsoft SQL Server is made up of four primary components, they are:

### 1. Database Engine

This part of SQL Server actually creates and stores relational databases.

### 2. SQL Server Analysis Services(SSAS)

SSAS is the data-analysis-component of SQL Server. It can create OLAP(On-line Analytical Processing)-cubes — sophisticated programming-objects for organizing data inside a relational database — and is data mining.

### 3. SQL Server Reporting Services(SSRS)

SSRS is a component of SQL Server that provides reporting capabilities of a database's operating system.

### 4. SQL Server Integration Services(SSIS)

SSIS is a component of SQL Server that does the Extract, Transform, and Load (ETL) process that allows you and facilitates you data from source systems for inclusion in the database on ready-to-use information.



## Features of MS SQL Server

Below are some of the features of MS SQL Server

- 1. Highest performing data warehouse:** MS SQL Server lets you get support for small data warehouses with enterprise data warehouses while reducing storage costs with enhanced data compression capabilities.
- 2. Security and compliance:** MS SQL Server helps to secure data for workloads that are mission-critical with a focus of proactive security approach. It always adds always Encrypted technology together with row-level security, transparent data-encryption (TDE), dynamic data masking, and column masking.
- 3. In-Database advanced analytics:** MS SQL Server lets you build intelligent applications with SQL Server Machine Learning Services using Python and R.
- 4. Persistent Memory Overview:** MS SQL Server provides support to Persistent Memory (PMEM) devices. SQL Server directly accesses the device, bypassing the storage stack of the operating system for the files placed on the PMEM device.
- 5. SQL Data Discovery And Classification:** SQL Data discovery and classification is integrated into the SQL Server engine with new modules. This creates GDPR analysis capabilities over each database.
- 6. Encrypted File System Kernels:** It secures on-premise client applications, data sent to the server-side. It secures the data from malware and privileged users.
- 7. UTF-8 Support:** SQL Server 2019 provides support for UTF-8 character encoding. We can now create char or nchar columns to store UTF-8 data. This feature improves data compatibility and performance improvements.
- 8. Subscribing to compliance:** This provides you to implement security compliance such as GDPR, with compliance of SQL Server instances and Azure SQL Database instances with simplified security best practices.



## Benefits of MS SQL Server

There are lots of benefits of MS SQL Server and some of them are:

1. The installation of MS SQL Server is straightforward.
2. The security features of MS SQL Server are better.
3. MS SQL Server has very robust performance.
4. The cost-of-ownership of MS SQL Server is lower.

## Why Study MS SQL Server?

1. Marketable Skills
2. Career Opportunities And Advancement
3. Increase Your Earning Potential
4. In-Demand Skill

## MS SQL Server Course Outline

- MS SQL Server • Introduction/Overview
- MS SQL Server • Editions
- MS SQL Server • Installation
- MS SQL Server • Architecture
- MS SQL Server • Management Studio
- MS SQL Server • Login Database
- MS SQL Server • Create Database
- MS SQL Server • Select Database
- MS SQL Server • Drop Database
- MS SQL Server • Creating Backups
- MS SQL Server • Restoring Databases
- MS SQL Server • Create Users
- MS SQL Server • Assign Permissions
- MS SQL Server • Monitor Database
- MS SQL Server • Services
- MS SQL Server • HA Technologies
- MS SQL Server • Reporting Services
- MS SQL Server • Execution Plans
- MS SQL Server • Integration Services
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