Database Fundamentals

Cybersecurity Department

Course Code: ***CBS 213***

Practical Lecture 1: Introduction to Lab Environment and MySQL Installation

Halal Abdulrahman Ahmed

Lecture Outline

- Course overview and objectives
- Assessment and grading policy
- Presentation and submission rules
- Lab rules and integrity policy
- Introduction to MySQL Workbench
- Installing MySQL on Windows and macOS

Learning Outcomes

By the end of this lab, students will be able to:

- Understand course expectations and evaluation methods.
- Install and set up **MySQL Workbench** successfully.
- Explain the purpose of **MySQL Server and Workbench**.
- Prepare their environment for upcoming database labs.

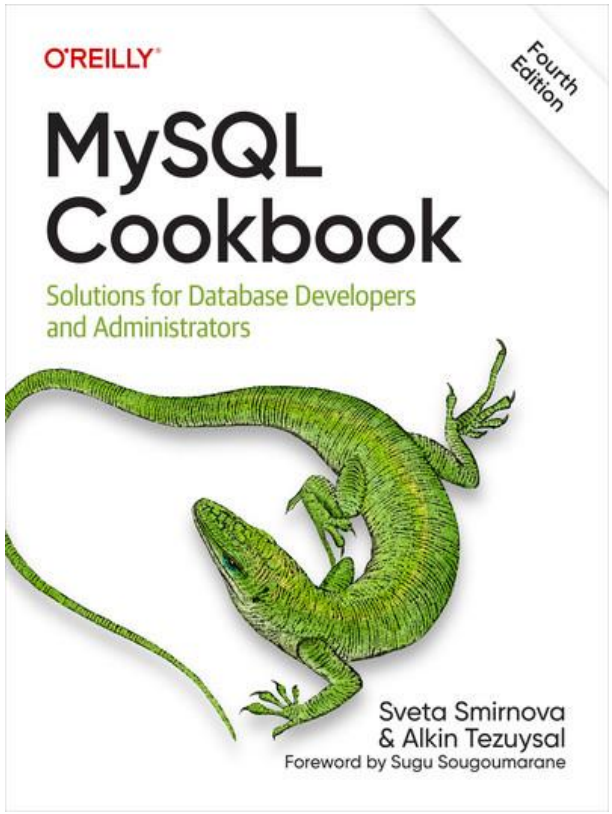
Course Overview

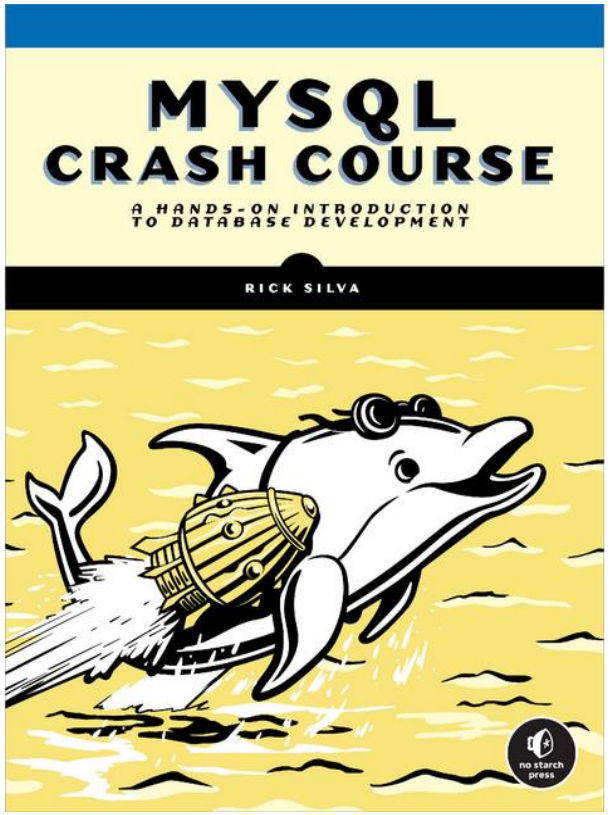
- This practical course introduces you to the fundamentals of **databases** through **MySQL**.
- You will gain hands-on experience in creating, managing, and querying databases using **MySQL Workbench**.

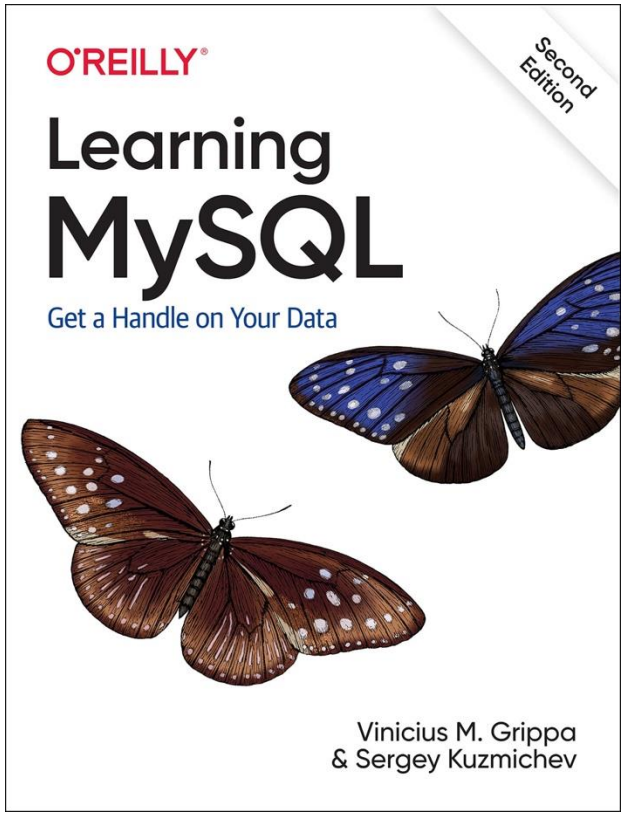
Course Objectives

- By the end of the course, you will be able to:
- Install and use **MySQL Workbench**.
- Create and manage **databases and tables**.
- Insert, update, and retrieve data using **SQL queries**.
- Understand relational concepts such as **primary keys and relationships**.
- Apply SQL skills to solve simple **real-world data problems**.

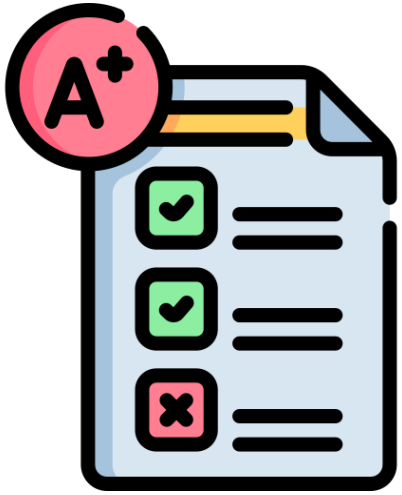
Course Materials (Practical)







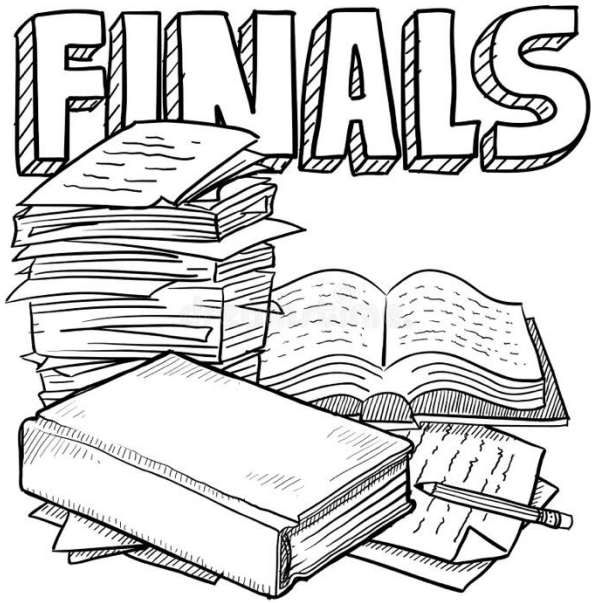
Assessment and Grading



Assessment Type	Weight	Quantity
Midterm Exam	20%	1
Quiz	10%	2–3
Lab Quiz	15%	2
Presentation	10%	1
Mini Project	5%	1-3
Final Exam	40%	1

Exam Format (Midterm & Final)

- Covers all **theoretical materials/topics** they are paper based exams.



Exam questions may include:

- Short answers
- Definitions & Explanations
- Scenario-based questions
- Multiple-choice questions
- True or False
- Problem-solving tasks

Laboratory Exam Format

- Computer-based only
- Focus on practical tasks
- Submit answers through system/Classroom

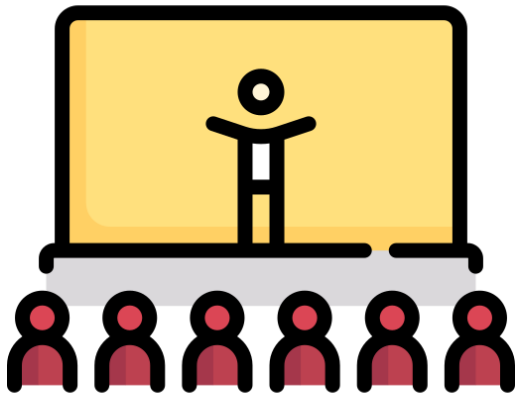
Quiz Format

- Short and simple
- 10–15 minutes only
- Small tasks
- Checks weekly understanding

Mini Project

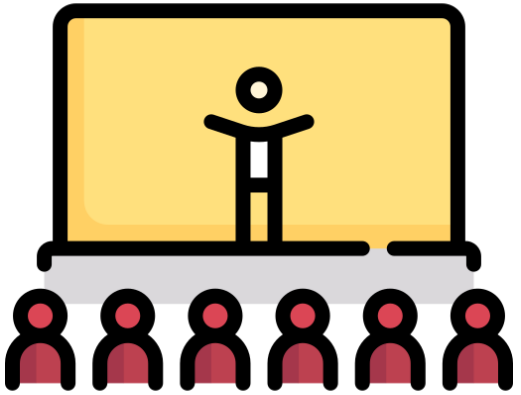
- Work in groups of 3–4
- Every couple of weeks we will have a mini project.
- Submit it by the deadline. **No extensions allowed.**

Presentation Guidelines



- **Form groups of 6 students.**
- **Choose ONE topic** within your group (first come, first served).
- **Inform the Class Representative**:
  - Class Rep writes **all groups**, **all member names**, and the **chosen topic, and sends full list in one single email**.
- **Time:** 20 minutes per group → **15 min** presentation + **5 min** Q&A.
- **Everyone presents.**
- Include: brief intro, key concepts, real example/case, visuals, and **one discussion question**.

Presentation Guidelines



- **Form groups of 6 students.**
- **Choose ONE topic** within your group (first come, first served).
- **Inform the Class Representative**:
  - Class Rep writes **all groups**, **all member names**, and the **chosen topic, and sends full list in one single email by 19 October 2025**.
- **Time:** 20 minutes per group → **15 min** presentation + **5 min** Q&A.
- **Submit slides via Google Classroom only.**
- **Deadline: 27 November 2025.**
- **Everyone presents.**
- Include: brief intro, key concepts, real example/case, visuals, and **one discussion question**.

Suggested Topics

- **SQL Injection Attacks** – how they work and how to prevent them.
- **Database Encryption** – securing data at rest and in transit.
- **Access Control & Authentication** in databases.
- **Backup & Recovery Strategies** for database security.
- **Database Role in Ransomware Attacks** – real case studies.
- **Cloud Databases (AWS, Azure, Google)** – benefits & risks.
- **NoSQL vs SQL Security** – challenges and differences.
- **Database Auditing & Logging** – importance for cybersecurity.
- **Data Privacy Laws (GDPR, HIPAA)** and their impact on databases.
- **Blockchain as a Secure Database** – myths and realities.

Suggested Topics (Cont.)

- **AI & Machine Learning in Database Security** – detecting anomalies.
- **Zero Trust Security Model** for databases.
- **Insider Threats in Database Systems** – how to detect and prevent.
- **Phishing & Social Engineering Attacks on Databases**.
- **Database Security in E-commerce Systems**.
- **Latest Data Breaches (2023–2025)** – what went wrong?
- **Database Firewalls & Intrusion Detection Systems**.
- **Password Management & Multi-Factor Authentication in Databases**.
- **Ethical Hacking for Database Testing** – penetration testing basics.
- **Future Trends in Database Security** – quantum computing, AI, blockchain.

Submission Policy

- Submit via **Google Classroom** only.
- **No late** submissions, and **no extensions** allowed.
- **Not** more than **25% AI-generated content** is allowed.
- Marks deducted for plagiarism.

Classroom/Lab Rules

- **Arrive on Time**: Students arriving **more than 5 minutes late** will not be allowed to enter and will be marked absent.
- **Attendance Matters**: Absences are recorded and may affect grades.
- **Respectful Environment**: Maintain silence, avoid distractions, and respect classmates and the instructor.
- **Devices Policy**: Phones and laptops should only be used for class activities.
- **Assignments & Exams**: Must be submitted/completed on time. No late submissions.
- **Academic Integrity:** Cheating or plagiarism is strictly prohibited.
- **Privacy Rule**: **Recording videos or taking photos without permission is not allowed.**

Contact Information

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Office Hours: Main Building – Room 321

MySQL Workbench Installation

What is MySQL Workbench?

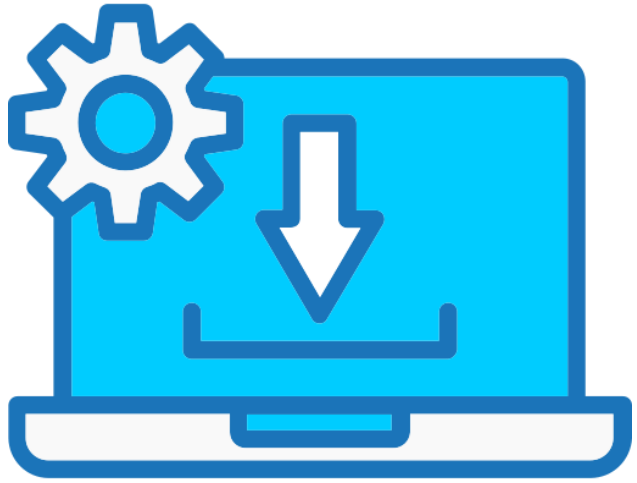
- **MySQL Workbench is a free tool** used to work with databases.
- It gives you a **simple, easy-to-use window** (instead of only using commands), you can:

1. **Create** new databases and tables
2. **Write and run SQL commands**
3. **See and edit data** in tables
4. **Manage users** and database settings

MySQL Workbench Installation

Installing MySQL Workbench (Windows)

- You can download MySQL from this link: https://dev.mysql.com/downloads/workbench
- Choose the correct version for your system:
  - **Windows (x86, 64-bit Installer)**
  - **macOS (Intel or Apple Silicon M1/M2/M3)**



Installing MySQL Workbench (Windows)

YouTube Video Resource:

- "*How to Install MySQL Workbench on Windows*"
- "*How to Install MySQL Workbench on Mac*"

Step-by-Step Guide to install MySQL Workbench

- MySQL Workbench Installation: A Step-by-Step Guide
- How to Install MySQL on Windows?
- How to Install MySQL and MySQL Workbench on Windows
- Installing MySQL Workbench in Mac OS


Any
Question