

# Database System

北京交通大学软件学院

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Download materials from

Course platform

Or

WeChat Group

# Introduction to the Course

## **Students:**

**sophomore at spring semester**

## **Prerequisite:**

**Java or VC, Data Structure**

## **For Practice Course:**

**Install one kind of DBMSs such as the latest version of Oracle, MySQL, SQL Server before during the first week.**

# Grades

**Usual performance :** (account for **50 %**) , **Open-book test**

- ◆ Test1 ( **10 pts** ) : introduction & relational database.
- ◆ Test2 ( **25 pts** ) : SQL.
- ◆ Test3 ( **15 pts** ) : Normalization & DB design & DB protection.

**Final exam:** (account for **50 %**) , **Open-book exam**

	Test 1	Test 2	Test 3
Time (Lecture)	7 (1h)	16 (2h)	24 (1h)
full score	10 pts	25 pts	15 pts
coverage	<b>Chapter 1-2</b> Introduction & Relational database	<b>Chapter 3</b> SQL	<b>Chapter 4-8</b> Normalization & DB design & DB protection

**24 Lectures in total.**

**Final could be held during Week 14-15 (周四)**

# Textbook and references

- 1 Thomas Connolly, Carolyn Begg. Database Systems : A Practical Approach to Design, Implementation, and Management. (5th Edition) Electronic Industry Publisher. (电子工业出版社) 2012.1
2. Jeffrey D.Ullman, Jennifer Widom. A First Course in Database Systems (third edition), China machine press, 2008.8.1.
3. 王珊，萨师煊。《数据库系统概论》（第5版），高等教育出版社, 2014.9 (for Chinese students)
- 4.王珊 《数据库系统概论（第5版）习题解析与实验指导》高等教育出版社 2015年7月

**You could download the English Textbooks from the course platform.**

# Content

## **Chapter 1 Introduction to Database Systems (5h)**

- ◆ Basic concepts
- ◆ Development History of Data Management Technology
- ◆ Data Model
- ◆ Architecture of Database System
- ◆ Data Independence

## **Chapter 2 Relational Database (4h)**

- ◆ Relational Data Model
- ◆ Relation Integrity
- ◆ Relation Algebra

QUIZ-1 (1h)

# Content

## **Chapter 3 SQL (Structured Query Language, 20h)**

### **3.1 Introduction to SQL**

### **3.2 Data Definition Statements**

### **3.3 Data Query Statements**

### **3.4 Data Modification Statements**

### **3.5 Views**

### **3.6 Programmatic SQL**

- ◆ Stored Procedure

- ◆ Constraints and Trigger

- ◆ SQL/CLI

- ◆ ODBC and JDBC

QUIZ-2 (2h)

# Content

## Chapter 4 Theory for Relational Database (5h)

- ◆ Problems
- ◆ Functional Dependency
- ◆ Armstrong's axioms
- ◆ The Process of Normalization

## Chapter 5 Database Design (3h)

- ◆ Database Development Lifecycle
- ◆ Entity/Relationship Model
- ◆ Enhanced Entity-Relationship Model
- ◆ From E/R Diagrams to Relations



# Content

## Chapter 6 Database Security (1h)

- ◆ Concepts
- ◆ Privileges (权限)
- ◆ Grant (赋予权限)
- ◆ Revoke (收回权限)

## Chapter 7 Concurrency Control (2.5h)

- ◆ Concept and Characteristics of Transaction
- ◆ 3 Potential Problems Caused by Concurrency
- ◆ Serializability (可串行化)
- ◆ Locking & 2PL
- ◆ Granularity of Data Items
- ◆ Isolation Levels

# Content

## Chapter 8 Database Recovery (2.5h)

### 8.1 Failure

### 8.2 Transactions and Recovery

### 8.3 Recovery Facilities (恢复机制)

Backup, Log files, Checkpoint

### 8.4 Recovery Techniques (恢复技术)

QUIZ-3 (1h)

# Review course platform

课程中心

当前课程：数据库系统

课程管理 教学资源 教学活动 课程建设 课程预览

教学资源

- 数据库系统课件
- 课程录像
- 新课程video
- 历届试题及答案
- 课后作业

名称	角色	分享	操作	状态
1-第1章(4个概念)				发布
2-第1章 (3个发展阶段)				发布
3-第1章 (数据模型)				发布
4-第1章 (三级模式)				发布
5-第1章 (两级独立型)				发布
6-第2章 (关系数据模型)				发布

关系代数：大学MOOC网站，搜“数据库系统概论（基础篇）”  
人民大学 王珊、杜小勇老师