东北大学秦皇岛分校本科课程教学大纲

一、课程基本信息

<table>
<tr><td>开课单位</td><td colspan="3">东北大学悉尼智能科技学院</td><td>课程代码</td><td colspan="6">3100213039</td></tr>
<tr><td>中文名称</td><td colspan="9">数据库原理</td></tr>
<tr><td>英文名称</td><td colspan="9">Database Principles</td></tr>
<tr><td>总学时</td><td>52</td><td rowspan="2">理论学时</td><td rowspan="2">40</td><td rowspan="2">实验学时</td><td rowspan="2">12</td><td rowspan="2">上机学时</td><td rowspan="2">0</td><td rowspan="2">设计学时</td><td rowspan="2">0</td><td rowspan="2">课外学时</td><td rowspan="2">0</td></tr>
<tr><td>学　分</td><td>3</td></tr>
<tr><td>课程类型</td><td colspan="9">☐理论课程　☑理论（含实验）课程　☐实践类课程</td></tr>
<tr><td>课程类别</td><td colspan="9">☐通识类　☐学科基础类　☑专业方向类　☐实践类</td></tr>
<tr><td>适用专业</td><td colspan="9">计算机科学与技术</td></tr>
<tr><td>先修课程</td><td colspan="9">《数据结构》</td></tr>
<tr><td>建议开课学期</td><td colspan="9">☐1-1 ☐1-2 ☐2-1 ☑2-2 ☐3-1 ☐3-2
☐4-1 ☐4-2 ☐5-1 ☐5-2 ☐*（代表每学期都开设）</td></tr>
<tr><td>考核方式</td><td colspan="3">☑考试 ☐考查</td><td>成绩分制</td><td colspan="5">☑百分制 ☐五级制 ☐二级制</td></tr>
<tr><td>使用教材</td><td colspan="9">1、 萨师煊, 王珊. 数据库系统概论(第 6 版). 高等教育出版社, 2023 年.</td></tr>
<tr><td>参考书及教学资源</td><td colspan="9">1、 Silberschatz B A ,Korth H F , Sudarshan S . Database System Concepts (7th Edition). 机械工业出版社. 2021.</td></tr>
<tr><td>其他说明</td><td colspan="9">无</td></tr>
</table>

二、课程简介

中文描述

本课程向学生介绍数据库系统的基本概念。学生们将学习如何在实际的应用系统中有效地构建、存储、组织和管理数据，以方便用户的应用。同时还学习如何使用 SQL 语言进行有效的数据检索和更改，针对具体的应用需求进行需求分析，数据库概念结构设计和逻辑结构设计。本课程教导学生认识到良好的数据库设计和管理的重要性和挑战，这是功能性软件应用程序开发的基础。同时，课程还融入了课程思政、工程伦理、数据安全的内容，旨在培育学生的工匠精神，引导学生将个人成长与行业、社会发展有机联系，强化数据安全意识。

本课程注重理论与实践的深度融合、强调行业联系，设计了一系列丰富的实验项目和作业，使学生能够亲身体验 DBMS 使用和利用 SQL 语言设计开发信息系统的全过程，从而有效提升解决实际问题的能力，为后续深造以及职业生涯的长远发展奠定坚实根基。

English Description

This subject introduces students to the fundamentals of effective database systems. Students are taught how data is structured and managed in an organization in a way that can be used effectively by applications and users. They also learn to use the language SQL for effective data retrieval and modification, according to the specific application requirements, learn how to study the requirement analysis, implementing database conceptual structure design and logical structure design. This subject teaches students to appreciate the significance and challenges of good database design and management, which underpin the development of functional software applications. Additionally, the subject incorporates elements of ideological education, engineering ethics, and data security, aiming to cultivate students' craftsmanship spirit, guide them to connect their personal growth with industry and societal development, and enhance their awareness of data security.

This subject emphasizes the deep integration of theory and practice, as well as industry connections. It has designed a series of rich experimental projects and assignments to enable students to experience firsthand the whole process of using Database Management Systems (DBMS) and designing and developing information systems by utilizing SQL language. , thereby effectively enhancing their ability to solve practical problems and laying a solid foundation for further advanced studies in computer network subjects and long-term career development.

三、课程目标

1、知识目标：

1-1：掌握集合运算、关系规范化理论并应用于数据库使用和设计过程。

Master set operations and the theory of relational normalization and apply them to the process of database usage and design.

1-2：深入理解 SQL 语言的特性，核心谓词及不同查询逻辑的建立；

Gain a deep understanding of the characteristics of SQL language, core predicates and the establishment of different query logics.

1-3：理解关系完整性、安全性的理论及现实意义；

Understand the theory and practical significance of relational integrity and security.

1-4：理解关系规范化相关理论，模式分解理论并能够应用于数据库模式设计优化过程；

Understand the relevant theories of relational normalization and schema decomposition theory and be able to apply them to the optimization process of database schema design.

1-5：熟悉数据库设计过程方法学，掌握数据库逻辑结构及物理结构设计步骤；

Be familiar with the methodology of the database design process and master the steps of designing the logical and physical structures of databases.

1-6：了解数据库恢复技术及并行化控制理论体系。

Have an understanding of database recovery techniques and the theoretical system of parallelization control.

2、能力目标：

2-1：具备 SQL 语言的使用能力，能够利用 SQL 语言完成数据库的查询、更新、完整性维护等工作；

Have the ability to use SQL language and be able to use SQL language to complete tasks such as database querying, updating and integrity maintenance.

2-2：学会 DBMS 的架构、安装、使用，具备使用 DBMS 相关客户端开发工具的能力；

Learn the architecture, installation and use of Database Management Systems (DBMS), and possess the ability to use relevant client development tools of DBMS.

2-3：具备使用存储过程、函数、触发器的能力；

Have the ability to use stored procedures, functions and triggers.

2-4：学会嵌入式 SQL 语言的使用，能够理解嵌入式 SQL 与主语言的通信方式，具备进行数据库相关程序开发的基础能力；

Learn to use embedded SQL language, be able to understand the communication methods between embedded SQL and the host language, and possess the basic ability to develop database-related programs.

2-5：了解数据库恢复技术，并发控制技术，具备一定的数据库系统管理维护能力。

Have an understanding of database recovery techniques and concurrency control techniques, and possess a certain ability to manage and maintain database systems.

3、**德育/素养目标：**

3-1：展示本专业在新时代中国特色社会主义建设中的成就和当前要解决的重大课题；

Demonstrate the achievements of this major in the construction of socialism with Chinese characteristics in the new era and the major issues that need to be solved currently.

3-2：具有良好的团队协作意识和能力、较强的表达能力和人际交往能力；

Have a good sense of and ability in team collaboration, as well as relatively strong expressive ability and interpersonal skills.

3-3：理解关系数据库架构及理论知识对于刻画工程实践问题的重要意义；

Understand the significant importance of the architecture and theoretical knowledge of relational databases in depicting engineering practice problems.

3-4：认知当前全球，特别是我国数据库理论的发展对提升中国工程关键技术及核心竞争力的重要意义；

Recognize the crucial significance of the current development of database theories globally, especially in China, for enhancing China's key engineering technologies and core competitiveness.

3-5：认知提升工程科技人才的创新创业能力、责任意识对提高中国在全球发展核心竞争力的作用；

Recognize the role of improving the innovation and entrepreneurship abilities and the sense of responsibility of engineering and technological talents in enhancing China's core competitiveness in global development.

3-6：认知大国工匠精神的内涵及时代意义，增强专业认同感、民族责任感；

Recognize the connotation and contemporary significance of the craftsmanship spirit of a major power, and strengthen professional identity and national responsibility.

3-7：具备良好的职业道德和社会责任感，遵纪守法。

Possess good professional ethics and a sense of social responsibility, and abide by laws and disciplines.

表 1 课程目标与毕业要求的对应关系

毕业要求	指标点	课程目标	关联 (H/M/L)
1、工程知识：能够将数学、自然科学、工程基础和专业知识用于解决复杂工程问题。	指标点 1-1：掌握数学、自然科学、工程基础和专业知识，并使用其建立正确的数学、物理学等模型以解释复杂工程问题；	1-1、1-2、1-3、1-4、1-5、1-6、2-1、2-2、2-3、2-4、2-5、3-1、3-2、3-3、3-6、3-7。	H
3、设计/开发解决方案：能够设计针对复杂物联网工程问题的解决方案，设计满足特定需求的软硬件系统，并能够在设计环节中体现创新意识，考虑社会、健康、安全、法律、文化以及环境等因素。	指标点 3-1：能够设计针对本专业相关复杂工程问题的解决方案，能够设计和开发实现特定功能、满足特定需求的计算机、软件或网络系统；	1-2、1-3、1-4、1-5、2-1、2-2、2-3、2-4、2-5、3-1、3-2、3-3、3-6、3-7。	M
	指标点 3-2：能够对不同设计方案进行比较和优化，在工作各环节中具有创新意识；	1-2、1-3、1-4、2-1、2-2、3-5、3-6、3-7。	M

4、研究：能够基于科学原理并采用科学方法对复杂工程问题进行研究，包括设计实验、分析与解释数据、并通过信息综合得到合理有效的结论。	指标点 4-2：能够结合本专业知识对实验数据进行分析与解释，设计并优化实验方案，并通过信息综合得到合理有效的结论；	1-1、1-2、1-3、1-4、1-5、1-6、2-1、2-2、2-3、2-4、2-5、3-1、3-2、3-3、3-4、3-5、3-6、3-7。	H
6、工程与社会：能够基于本专业相关背景知识和相关法规标准进行合理分析，评价本专业工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响，并理解应承担的责任。	指标点 6-1：能够基于本专业相关背景知识进行合理分析，评价计算机相关工程实践和复杂工程问题解决方案对社会、健康、安全、法律以及文化的影响；	1-3、1-4、2-1、3-2、3-6、3-7。	L
	指标点 6-2：理解本专业工程实践和相关行业工程问题解决方案对社会、健康、安全、法律以及文化应承担的责任。	1-3、1-4、2-1、3-2、3-6、3-7。	L

四、主要教学内容

（一）理论教学

第 1 章：Introduction（支撑教学目标 1-1,1-2,1-3,1-4,2-2,3-1,3-2,3-3,3-4,3-5,3-6,3-7）

【1】知识点：

(1) Database system applications.
(2) Purpose of database systems.
(3) View of data.
(4) Data models
(5) Database languages.
(6) Database system: DB, DBMS, DBS.
(7) Database and application architecture.
(8) Database users and administrators.
(9) History of database systems.

【2】学习目标：

理解： History of database systems; Application of database systems; Purpose of database systems; Database languages.

掌握： Data models; Database system; Database and application architecture; Database users and administrators.

【3】重点内容：

(1) Database system: DB, DBMS, DBS.
(2) Database and application architecture.
(3) Database users and administrators.
(4) Data models

【4】难点内容：

(1) Database and application architecture, Data models.

【5】思政案例：

In the theoretical teaching of "Database development course", the lecture compares the backward technology of our country in the past and the technological leap of the present, and compares the monopoly of IBM in the network database and Oracle in the relational database. It emphasizes that science and technology are the primary productive forces and inspires students' sense of responsibility and self-confidence.

第 2 章： Introduction to the relational model（支撑教学目标 1-1,1-2,1-3,2-1,2-2,3-1,3-2,3-6,3-7）

【1】知识点：

(1) Structure of relational database

(2) Database schema

(3) Keys.

(4) Relational query language.

(5) The relational algebra.

【2】学习目标：

理解： Structure of relational database; Database schema; relational query language.

掌握： The relational algebra.

【3】重点内容：

(1) Database schema

(2) The relational algebra.

【4】难点内容：

(1) The relational algebra.

第 3 章： Introduction to SQL（支撑教学目标 1-1,1-2,1-3,2-1,2-2,3-1,3-2,3-5,3-6,3-7）

【1】知识点：

(1) Overview of the SQL query language.

(2) SQL data definition.

(3) Basic structure of SQL queries.

(4) Additional basic operations.

(5) Set operations.

(6) Null values.

(7) Aggregate functions.

(8) Nested subqueries.

【2】学习目标：

理解： Overview of the SQL query language; SQL data definition.

掌握： Basic structure of SQL queries; Additional basic operations; Set operations; Null values; Aggregate functions; Nested subqueries.

【3】重点内容：

(1) Basic structure of SQL queries.

(2) Additional basic operations.

(3) Set operations.

(4) Null values.

(5) Aggregate functions.

(6) Nested subqueries.

【4】难点内容：

(1) Nested subqueries.

【5】思政案例：

Introduction to E.F. Code, founder of relational database theory, 1970, IBM researcher, Dr. Edgar

Frank Codd, known as the "father of Relational databases," published "A Relational Model of Data for Large Shared" in the journal Communication of the ACM In the paper "Data banks (Relational Model of Large shared Database)", the concept of relational model of database is proposed for the first time and the theoretical foundation of relational model is laid. Introducing our 40 years of catch-up in the computer field, we have achieved fruitful results in the field of data storage and processing in just 40 years, inspiring students' national pride, artisan spirit of continuous innovation and spirit of exploration in computer science.

第 4 章： Intermediate SQL and advanced SQL （支撑教学目标 1-2, 1-3, 2-1, 2-2, 2-3, 2-4, 3-1, 3-2, 3-5, 3-6, 3-7）

【1】知识点：

(1) Join expressions.
(2) Views.
(3) Integrity constraints.
(4) SQL Data Types and Schemas.
(5) Index definition in SQL.
(6) Triggers.
(7) Functions and procedures.

【2】学习目标：

理解： Triggers; Functions and procedures; Integrity constraints; SQL Data Types and Schemas
掌握： Join expressions; Views; Index definition in SQL.

【3】重点内容：

(1) Join expressions.
(2) Views.
(3) Index definition in SQL.

【4】难点内容：

(1) Triggers.
(2) Functions and procedures.

【5】思政案例：

Database security leads to the important role of information security. With the rapid development of information technology, database is an important tool for storing and managing massive data, and its security problems become increasingly prominent. Database security is not only related to the protection of personal information privacy, but also involves major issues such as enterprise secrets and national security. Furthermore, the current affairs of the major concerned by students, especially the key issues such as the urgent need for independent development of the IT industry as the core industry in the trade war, are raised to stimulate students' sense of national responsibility. Students are required to cultivate awareness of rights, responsibility and discipline, and adhere to justice and the rule of law.

第 5 章： Database design（支撑教学目标 1-1, 1-2, 1-3, 1-4, 2-1, 2-2, 2-3, 2-4, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6,3-7）

【1】知识点：

(1) Database design process.
(2) Data dictionary.
(3) Data flow diagram
(4) Database design using the E-R model.
(5) Reducing E-R diagrams to relational schemas.

【2】学习目标：

理解： Complex attributes; Removing Redundant Attributes in Entity Sets; Extended E-R features.

掌握： Database design using the E-R model; Reducing E-R diagrams to relational schemas.

【3】重点内容：

(1) Database design using the E-R model.

(2) Reducing E-R diagrams to relational schemas.

【4】难点内容：

(1) Database design using the E-R model.

(2) Reducing E-R diagrams to relational schemas.

第 6 章：Relational database design theory（支撑教学目标 1-1,1-2,1-3,1-4,2-1,2-2, 2-3, 2-4, 3-2, 3-5, 3-6, 3-7）

【1】知识点：

(1) Features of good relational designs.

(2) Functional-dependency theory.

(3) Decomposition using functional dependencies.

(4) Normal forms.

(5) 1NF, 2NF, 3NF, BCNF.

(6) Algorithms for decomposition using functional dependencies.

【2】学习目标：

理解： Multivalued Dependencies; 4NF, 5NF; Features of good relational designs.

掌握： Decomposition using functional dependencies.

【3】重点内容：

(1) Functional-dependency theory.

(2) Algorithms for decomposition using functional dependencies.

(3) 1NF, 2NF, 3NF, BCNF.

【4】难点内容：

(1) Functional-dependency theory.

(2) Algorithms for decomposition using functional dependencies.

【5】思政案例：

Introducing the normalization theory of relational database, this theory not only reflects the science and technology of database design, but also contains profound ideological and political elements, such as logical thinking, optimization thinking, and the craftsman spirit of excellence. In the teaching of the normalization theory of relations, students are guided to deeply understand and apply this theory, and through the normalization understanding, students are established to establish the abstract modeling thinking ability of establishing tightly coupled factors as internal logical relations and abstracting loosely coupled factors as external logical relations through analysis and decomposition. Cultivate their logical thinking ability and professional spirit of excellence.

第 7 章：Transactions processing （支撑教学目标 1-1,1-4,2-1,2-2, 3-2, 3-6, 3-7）

【1】知识点：

(1) Transaction concept.

(2) A simple transaction model.

(3) Transaction atomicity and durability.

(4) Transaction isolation.

(5) Serializability.

(6) Transaction isolation and atomicity.

(7) Transaction isolation levels.

【2】学习目标：

理解： Transaction Isolation Levels; Transaction concept.

掌握： Transaction atomicity and durability; Transaction isolation; Serializability.

【3】重点内容：

(1) Transaction atomicity and durability.

(2) Transaction isolation.

(3) Serializability.

【4】难点内容：

(1) Serializability.

第 8 章：Concurrency control（支撑教学目标 1-1,1-4,2-1,2-2, 2-3, 2-4, 2-5, 3-1, 3-2, 3-6, 3-7）

【1】知识点：

(1) Lock-based protocols.

(2) Deadlock handling.

(3) Multiple granularity.

(4) Insert operations, delete operations, and predicate reads.

(5) Timestamp-based protocols.

【2】学习目标：

理解： Lock-based protocols; Insert operations, delete operations, and predicate reads; Timestamp-based protocols.

掌握：Lock-based protocols; Deadlock handling; Multiple granularity.

【3】重点内容：

(1) Lock-based protocols.

(2) Deadlock handling.

【4】难点内容：

(1) Deadlock handling.

【5】思政案例：

Introduces the development process of 12306 data storage and the gradual optimization of user experience, from the initial difficult to grab a ticket to meet the demand of peak booking to the current user experience of clear and high response speed, leads to the technical update speed of database application in China's basic information industry and its important role in people's lives, and stimulates students 'national pride. The importance of cognitive technology improvement, and leads to the important role of database concurrent access control, stimulate students 'enthusiasm for learning.

第 9 章：Recovery system（支撑教学目标 1-1, 1-4, 1-5, 1-6, 2-5, 3-2,3-6,3-7）

【1】知识点：

(1) Failure classification.

(2) Data storage.

(3) Log files.

(4) Recovery and atomicity.

(5) Recovery algorithm.

(6) Buffer management.

(7) Failure with loss of non-volatile storage.

(8) High availability using remote backup systems.

(9) Early lock release and logical undo operations.

【2】学习目标：

理解：Data storage; Failure classification; Buffer management; High availability using remote backup systems.

掌握：Log files; Recovery and atomicity; Recovery algorithm; Failure with loss of non-volatile storage; Early lock release and logical undo operations.

【3】重点内容：

(1) Log files.

(2) Recovery and atomicity.

(3) Recovery algorithm.

(4) Early lock release and logical undo operations.

【4】难点内容：

(1) Early lock release and logical undo operations.

（二）实验教学

The experimental teaching section uses Microsoft SQL Server and Oracle MySQL as compilation platforms, and adopts a combination of online experimental platform automatic evaluation system and offline homework for teaching. The experimental project adopts a teaching mode that focuses on students' practical operation and is supplemented by teachers' instruction. It fully utilizes various software resources, explores students' potential, lays a solid foundation in database programming, and enhances students' practical development abilities. The project names and class hour allocation related information for experimental teaching are shown in Table 2.

表 2　实验教学信息表

序号	实验项目名称	实验学时	每组人数	实验类型	实验性质
1	Establishment and Management of Databases Experiment	2	1	Design	Elec
2	Establishment of Data Table and Constraint Integrity Experiment	2	1	Design	Elec
3	Data Update and Data Query Experiment	2	1	Design	Elec
4	Index and View Experiment	2	1	Design	Elec
5	System stored procedures and triggers	2	1	Design	Elec
6	Connection between databases and high-level language applications	2	1	Comp	Elec

实验项目一： Establishment and Management of Databases Experiment（支撑教学目标 1-1, 1-2, 1-3, 1-4, 2-2, 3-1, 3-2, 3-3, 3-4, 3-5, 3-6, 3-7）

【1】实验内容：

(1) Establishment of Experimental Environment.

(2) Establishing a database.

(3) The use of Create/Alter database statements.

【2】实验目的：

(1) Master the method to establish and manage databases in SQL Server/MySQL.

(2) Be proficient in using the create/filter database statement.

【3】教学要求：

(1) Each student completes the online experiment independently

(2) Independently complete off class exercises and write lab reports.

【4】实验方式：Programming.

【5】实验场地与设备：Experimental Center of School of Computer and Communication Engineering, Computer.

实验项目二：Establishment of Data Table and Constraint Integrity Experiment. （支撑教学目标 1-1, 1-2, 1-3, 2-1, 2-2, 3-1, 3-2, 3-6, 3-7）

【1】实验内容：

(1) Establishing a database table.

(2) Add constraint integrity conditions to the data table.

(3) The use of Create/Alter table statements.

【2】 实验目的：

(1) Master the method to establish and manage databases table in SQL Server/MySQL.

(2) Add constraint integrity conditions to the data table.

(3) Be proficient in using the create/filter table statement.

【3】 教学要求：

(1) Each student completes the online experiment independently

(2) Independently complete off class exercises and write lab reports.

【4】实验方式： Programming.

【5】实验场地与设备：Experimental Center of School of Computer and Communication Engineering, Computer.

实验项目三： Data Update and Data Query Experiment. （支撑教学目标 1-1, 1-2, 1-3, 2-1, 2-2, 3-1, 3-2, 3-6, 3-7）

【1】 实验内容：

(1) Inserting and updating data table records.

(2) Use of insert into/update statements.

(3) Use of Select statement and its clauses.

【2】 实验目的：

(1) Master the method to inserting and updating data records in SQL Server/MySQL

(2) Be proficient in using the insert into/update statement.

【3】 教学要求：

(1) Each student completes the online experiment independently.

(2) Independently complete off class exercises and write lab reports.

【4】 实验方式： Programming.

【5】 实验场地与设备： Experimental Center of School of Computer and Communication Engineering, Computer.

实验项目四：Index and View Experiment. （支撑教学目标 1-2, 1-3, 2-1, 2-2, 2-3, 2-4, 3-1, 3-2, 3-5, 3-6, 3-7）

【1】 实验内容：

(1) Establish and manage indexes.

(2) Establish and manage views.

(3) Inserting, updating, and deleting data source table records through views.

(4) The use of index/view statements.

【2】 实验目的：

(1) Master the method to indexes and views in SQL Server/MySQL

(2) Master the methods of inserting, updating, and deleting data source table records through views.

(3) Be proficient in using the Create/filter index/view statement.

【3】 教学要求：

(1) Each student completes the online experiment independently

(2) Independently complete off class exercises and write lab reports.

【4】实验方式： Programming.

【5】实验场地与设备： Experimental Center of School of Computer and Communication Engineering, Computer.

实验项目五：System stored procedures and triggers.（支撑教学目标 1-1,1-2,1-3,1-4,2-1,2-2, 2-3, 2-4, 3-2, 3-5, 3-6, 3-7）

【1】 实验内容：

(1) Establish and manage Stored Procedures.

(2) Establish and manage Triggers.

(3) Understanding the Application of Stored Procedures and Triggers in Database Transaction Processing（Inserting, updating, and deleting）.

(4) The use of procedure/trigger statements.

【2】 实验目的：

(1) Master the methods of establishing and managing system stored procedures and triggers in database management systems.

(2) Master the application of stored procedures and triggers in database programming.

【3】 教学要求：

(1) Each student completes the online experiment independently

(2) Independently complete off class exercises and write lab reports.

【4】实验方式： Programming.

【5】实验场地与设备：Experimental Center of School of Computer and Communication Engineering, Computer.

实验项目六：Connection between databases and high-level language applications.（支撑教学目标 1-1, 1-2, 1-3, 1-4, 2-1, 2-2, 2-3, 2-4, 3-2, 3-5, 3-6, 3-7）

【1】 实验内容：

(1) Master the database system environment configuration for enabling database network connectivity.

(2) Using methods such as ODBC/JDBC to connect to databases on the application side.

(3) The use of database connection objects and connection strings in applications.

【2】 实验目的：

(1) Master the methods of connecting databases in high-level language programming environments.

(2) Be proficient in using database connection objects and connection strings.

(3) Master the methods of connecting databases directly through high-level language clients and through data sources.

【3】 教学要求：

(1) Each student completes the online experiment independently

(2) Independently complete off class exercises and write lab reports.

【4】实验方式： Programming.

【5】实验场地与设备： Experimental Center of School of Computer and Communication Engineering, Computer.

五、教学安排与学时分配

Course is given priority to with classroom teaching, experiment teaching form. The classroom teaching focuses on the basic concepts, theories, principles and practical operations of this course. The course focuses on the fundamental task of moral education, with the general goal of cultivating moral, intellectual, physical, aesthetic and labor to develop socialist builders and successors in an all-round way. Based on the basic structure of relational database, the course gradually expands, and deeply explains relational algebra, SQL language, database specification theory and database design methodology, as well as basic data recovery and concurrent processing technology. The course makes full use of offline classes, online teaching resources and ideological and political cases to carry out teaching activities, give play to the role of theoretical knowledge transfer, experimental practice operation and value guidance, cultivate the feelings of the country and the concept of strengthening the country, solid basic knowledge, improve practical skills and innovative spirit, and establish a correct outlook on life, world outlook and values. The allocation of credit hours for offline face-to-face classes is shown in Table 3.

表 3 学时分配表

讲　　课　　内　　容		学时				
		讲课	实验	上机	设计	课外
第 1 章	Introduction	4	0	0	0	0
第 2 章	Introduction to the relational model	6	0	0	0	0
第 3 章	Introduction to SQL	6	4	0	0	0
第 4 章	Intermediate SQL and advanced SQL	6	4	0	0	0
第 5 章	Database design	6	4	0	0	0
第 6 章	Relational database design theory	4	0	0	0	0
第 7 章	Transactions processing	2	0	0	0	0
第 8 章	Concurrency control	2	0	0	0	0
第 9 章	Recovery system	2	0	0	0	0
总复习	Revision	2	0	0	0	0
小计		40	12	0	0	0
总计	52					

六、教学方法

1、Teaching basic principles, combining theory with practice, emphasizing the application of materials and design principles, cultivating students' innovative ability.

2、Adopt the teaching method combining multimedia courseware, network teaching and traditional teaching to give the classroom vitality.

3、Theoretical teaching is combined with discussion format to stimulate students' learning motivation, cultivate their ability to study independently, teamwork skills, and problem-solving skills. The relevant knowledge and development history of domestic databases are introduced to show the development process of China's IT industry, cultivate students' sense of responsibility and reinforce their learning interest.

七、成绩评定

1、 The examination format of this course is closed-book and is evaluated on a hundred-mark scale. The final grade is comprehensively assessed based on regular homework, classroom inquiries, classroom communication, experimental outcomes and final examination results.

(1) The usual performance constitutes 30%, mainly encompassing comprehensive evaluations such as classroom communication, homework, and online material study.

(2) The experimental performance makes up 20%, mainly including computer practice exercises, homework and evaluations.

(3) The final examination result constitutes 50%, mainly the score of the test paper (open-book test).

2、 Those who are deficient in experiments, homework, etc. by more than one-third of the requisite amount, or who are absent from classes for more than one-third of the planned class hours, or who fail the experimental assessment will be disqualified from the assessment of this course.

八、评价及持续改进

1. Teaching Syllabus

Assessment cycle: 4 years, Revision cycle: 4 years.

Improvement measures: The course leader organizes all teachers of the course team to discuss and put forward improvement suggestions, which are reviewed by the director of the teaching and research section and approved by the dean of teaching.

2. Performance Evaluation and Assessment

Assessment cycle: 1 academic year, Evaluation basis: Comprehensive analysis of students' final grades.

Improvement measures: Based on the distribution of students' final grades, corresponding content adjustments and optimizations are carried out, and teaching methods are improved.

撰写： 敬茂华 李佳音

审核： 韩鹏

批准： 史闻博

日期： 2023.07.05