

COURSE SYLLABUS

CSC10006 – Introduction to Database

1. GENERAL INFORMATION

Course name:	Introduction to Database
Course name (in Vietnamese):	Cơ sở dữ liệu
Course ID:	CSC10006
Knowledge block:	Basic Professional Knowledge
Number of credits:	4
Credit hours for theory:	45
Credit hours for practice:	30
Credit hours for self-study:	90
Prerequisite:	None
Prior-course:	CSC10004 – Data structures and Algorithms
Instructors:	...

2. COURSE DESCRIPTION

The course introduces the overview of the needs of databases in enterprises or organizations. The course provides the study of data models including entity relationship model (or ER model), relational database model and the examination of practical issues such as database design, setup, and manipulation. For database manipulation, the course guides how to use database languages such as relational algebra, relational calculus and structured query language (SQL). The course also provides concepts of functional dependency, normal forms of database schemes as well as the way to normalize a database scheme. Other crucial topics include integrity constraints and the enforcement of all of them. Moreover, the techniques, tools and skills are provided for students to declare and manipulate the database via a relational database management system. The course also mentions future trends in database systems research. The course mentions the way to get the data managed by a selected database management system.

3. COURSE GOALS

On successful completion of this course, students will be able to:

ID	Description	Program LOs
G1	Apply soft skills to work independently or in groups to solve issues in database systems.	2.1.1, 2.2.2
G2	Practice English reading comprehension skills to read textbooks and other documents related to database systems.	2.4.3, 2.4.5
G3	Explain basic concepts and characteristics of the database and database systems.	1.3.5, 1.3.1; 1.3.2; 1.3.3; 1.3.4
G4	Apply the Entity-Relationship Model and Relational Data Model for data modeling.	4.2.2, 4.2.3, 4.1.1, 4.1.2, 4.1.3, 4.1.4, 4.3.1, 4.3.2
G5	Use database languages to manipulate the databases.	1.3.5, 1.3.7
G6	Discover the quality of a given database scheme and practice the methods to normalize a database scheme.	4.1.4
G7	Describe and define integrity constraints in a database.	1.3.5, 1.3.7
G8	Describe the future trends in database systems research.	2.1.8
G9	Set up and manipulate the database using a relational database management system.	1.3.7

4. COURSE OUTCOMES

CO	Description	I/T/U
G1.1	Apply soft skills independently or in groups to solve issues in database systems.	U
G2.1	Practice English reading comprehension skills to read textbooks and other documents related to database systems.	U
G3.1	Explain the role of databases in information systems and basic concepts about databases and database models.	T
G3.2	Explain advantages or disadvantages when organizing data in a database or using files.	T
G4.1	Identify all entities of the data component in a real-world application and the relationships between them.	T, U

CO	Description	I/T/U
G4.2	Construct the entity relationship model and identify the cardinality and participation constraints.	T, U
G4.3	Execute the obtained entity relationship model to corresponding relational database model.	T, U
G5.1	Operate on the databases using relational algebra language.	T, U
G5.2	Operate on the databases using structured query language (SQL).	T, U
G5.3	Operate on the databases using relational calculus language.	T, U
G6.1	Explain the concepts related to normal forms and quality of a database scheme.	T
G6.2	Discover the quality of the database schemes and enhance the quality of them.	T, U
G7.1	Identify all the integrity constraints existed in a given database.	T
G7.2	Define the integrity constraints in a relational database management system.	T, U
G8.1	Describe the future trends in database systems research.	I
G9.1	Set up and manipulate the database using a relational database management system.	T, U
G9.2	Create and manipulate the database using an interface programming language.	T, U

5. TEACHING PLAN

THEORY

ID	Topic	CO	Teaching/Learning Activities	Assessments
1	An overview of database systems	G2.1, G3.1, G3.2	Lecturing, Q&A Chapter 1, 2 [1]	
2	Entity relationship model	G1.1, G4.1, G4.2	Lecturing, Discussion Chapter 4 [1]	HW1
3	Relational data model	G1.1, G2.1, G3.1, G4.3	Lecturing, Discussion Chapter 5 [1]	HW1
4	Relational algebra	G1.1, G2.1, G5.1	Lecturing, Discussion Chapter 8 [1]	HW2
5	Structured Query Language (SQL)	G1.1, G2.1, G5.2	Lecturing, Discussion Chapter 6 [1]	HW2
6	Relational calculus	G1.1, G2.1, G5.3	Lecturing, Discussion Chapter 8 [1]	HW2
7	Functional dependency and normal forms	G1.1, G2.1, G6.1, G6.2	Lecturing, Discussion Chapter 14 [1]	HW3
8	Functional dependency and Normal forms (cont.)	G1.1, G2.1, G6.1, G6.2	Lecturing, Discussion Chapter 14 [1]	HW3
9	Integrity constraints	G1.1, G2.1, G7.1	Lecturing, Discussion Chapter 5 [1]	HW4
10	Integrity constraints (cont)	G1.1, G2.1, G7.1	Lecturing, Discussion Chapter 5 [1]	HW4
11	Review			

LABORATORY

ID	Topic	CO	Teaching/Learning Activities (samples)	Assessments
1	SQL Server installation. Declare the database using SQL Server's user interface.	G1.1, G9.1	Lecturing, Discussion	LW1
2	Declare the database using DML (Data Definition Language).	G1.1, G9.1	Lecturing, Discussion	LW1
3	Simple queries using SQL.	G1.1, G5.2	Lecturing, Discussion	LW1
4	Using GROUP BY clause.	G1.1, G5.2	Lecturing, Discussion	LW1
5	Mid-term examination (for lab work).		Lecturing, Discussion	LW1
6	Nested queries.	G1.1, G5.2	Lecturing, Discussion	LW2
7	Other types of queries.	G1.1, G5.2	Lecturing, Discussion	LW2
8	Stored procedures and triggers.	G7.2, G9.1	Lecturing, Discussion	LW2
9	Connect and manipulate the database using an interface programming language.	G1.1, G9.2	Lecturing, Discussion	LW2
10	Final examination (for lab work).			LW2

6. ASSESSMENTS

ID	Topic	Description	CO	Ratio (%)
A1	Assignments	Exercises in class/Homework		25%
A11	Exercise	Small exercises in class for each topic.	G1.1, G2.1, G4.1, G4.2, G4.3, G5.1, G5.2, G5.3, G6.1, G6.2, G7.1	15%
A12	Homework: HW1-HW4	Do homework based on knowledge taught in class.	G1.1, G2.1, G4.1, G4.2, G4.3, G5.1, G5.2, G5.3, G6.1, G6.2, G7.1	10%
A2	Lab LW1, LW2	In-class programming exam	G1.1, G2.1, G5.2, G7.2, G9.1, G9.2	30%
A3	Final Exam	Describe the understanding on different topics, analyze and give solutions.	G1.1, G3.1, G3.2, G4.1, G4.2, G4.3, G5.1, G5.2, G5.3, G6.1, G6.2, G7.1, G7.2	45%
A4	Bonus			+/-10%

7. RESOURCES

Textbooks

- [1] Fundamentals of Database Systems (7th Edition), Ramez Elmasri, Shamkant B. Navathe, Addison Wesley, 2017.

Reference books

- [2] Database Systems: The Complete Book (2nd Edition), Hector Garcia-Molina, Jeffrey D. Ullman, Jennifer Widom, Prentice Hall, 2008.

Software

- [3] MS-SQL Server (or PostgreSQL).

8. GENERAL REGULATIONS & POLICIES

REGULATIONS

- All students are responsible for reading and following strictly the regulations and policies of the school and university.
- Students who are absent for more than 3 theory sessions are not allowed to take the exams.
- For any kind of cheating and plagiarism, students will be graded 0 for the course. The incident is then submitted to the school and university for further review.
- Students are encouraged to form study groups to discuss the topics. However, individual work must be done and submitted on your own.

POLICIES

Class Attendance and Participation

- Regular class attendance is strongly advised and is necessary for students to fully grasp many of the course concepts.
- Please be on time to class.
- If you miss a class session, it will be your responsibility to find out the materials that were covered.
- Students in attendance are expected to be active participants in the course. The participation includes contributing to class discussions, providing insight into the class discussion topics, raising questions, and relating class material to personal experiences and other course topics.

Computer Usage

Moodle and e-mail will be used to communicate with students and disseminate materials and assignments throughout the course. So, students should check Moodle and their email at least once per day.