COURSE SYLLABUS
CSC10006 – Introduction to Databases

1. GENERAL INFORMATION

Course name:	Introduction to Databases
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:	Lecturers of Information System Department.

2. COURSE DESCRIPTION

The course gives an overview introduction of the needs of databases in enterprises or organizations. It provides students with the basic knowledge about the database system focusing on relational databases. Besides, this course emphasizes the data models including entity relationship model (or ER model), relational database model and the examination of practical issues such as database design and data manipulation. It guides how to use database languages such as relational algebra, relational calculus and structured query language (SQL) for manipulating data. The course also provides concepts of functional dependency, normal forms of database schemas as well as how to normalize a database schema. Other crucial topics include integrity constraints and their implementation in database systems. Moreover, the techniques, tools and skills are provided for students to create and manipulate the

database via a relational database management system. The course also mentions some recent trends in database systems practice and research.

3. COURSE GOALS

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

ID	Description	Program LOs
G1	Work independently or in group to solve issues in database systems	2.1.1, 2.2.2
G2	Practice English reading comprehension skills by reading 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
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 create and manipulate the databases	1.3.5, 1.3.7
G6	Evaluate the quality of a given database schema and practice the methods to normalize a database schema	4.1.4
G7	Describe and enforce integrity constraints in a database	1.3.5, 1.3.7
G8	Describe the future trends in database systems research	2.1.8, 1.4.4
G9	Setup and manipulate the database using a relational database management system	1.3.7

4. COURSE OUTCOMES

CO	Description	I/T/U

G1.1	Work independently or in group 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	Understand 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
G4.2	Draw the entity relationship model and identify the cardinality and participation constraints	T, U
G4.3	Transfer 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 schema	T
G6.2	Evaluate the quality of the database schemas and enhance the quality of them.	T, U
G7.1	Identify all the integrity constraints existed in a given database	T
G7.2	Enforce the integrity constraints in a relational database	T, U

	management system	
G8.1	Describe the future trends in database systems research	I
G9.1	Setup and manipulate the database using a relational database management system	T, U
G9.2	Connect and manipulate the database using an interface programming language.	T, U

5. TEACHING PLAN

THEORY

ID	Topic	Course outcomes	Teaching/Learning Activities (samples)	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	Course outcomes	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	LW2
3	Simple queries using SQL	G1.1, G5.2	Lecturing, Discussion	LW3
4	Using GROUP BY clause	G1.1, G5.2	Lecturing, Discussion	LW3
5	Mid-term examination (for lab work)		Lecturing, Discussion	LW3
6	Nested queries	G1.1, G5.2	Lecturing, Discussion	LW3
7	Other types of queries	G1.1, G5.2	Lecturing, Discussion	LW3
8	Stored procedures and triggers	G7.2, G9.1	Lecturing, Discussion	LW4
9	Connect and manipulate the database using an	G1.1, G9.2	Lecturing, Discussion	LW5

	interface programming language			
10	Review			

6. ASSESSMENTS

ID	Topic	Description	Course outcomes	Ratio (%)
A1	**Assignments**			**20%**
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	10%
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**			**40%**
A21	Weekly lab work: LW1-LW5	Practicing based on knowledge taught in class	G1.1, G2.1, G5.2, G7.2, G9.1, G9.2	10%
A22	Lab mid-term exam	In-class programming exam on computer Closed book exam	G1.1, G5.2, G7.2, G9.1	10%
A23	Lab final exam	In-class programming exam	G1.1, G5.2,	20%

		on computer Closed book exam	G7.2, G9.1	
A2	**Exams**			**40%**
A21	Final examination	Closed-book 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	40%

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

[1].   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 on 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 e-mail at least once per day.

When sending e-mail to the instructor, please begin the "Subject" of the message with the following: [Course_ID]*<space>*