

## **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 an overview of the needs for databases in enterprises or organizations. It covers the study of data models including entity relationship model (or ER model), relational database. Additionally, it examines practical issues such as database design, setup, and manipulation. In terms of database manipulation, the course guides students on using database languages such as relational algebra, relational calculus and structured query language (SQL). It also delves into concepts of functional dependency, normal forms of database schemes as well as the process to normalize a database scheme. Other crucial topics include integrity constraints and their enforcement. Moreover, the course equips students with techniques, tools and skills to declare and manipulate databases through a relational database management system. It also touches upon future trends in database systems research. Finally, the course outlines the methods for managing data within a selected database management system.

### 3. COURSE GOALS

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

ID	Description	Program LOs
G1	Applying soft skills to work independently or in groups to solve issues in database systems.	2.1.1, 2.2.2
G2	Practicing English reading comprehension skills to read textbooks and other documents related to database systems	2.4.3, 2.4.5
G3	Explaining basic concepts and characteristics of the database and database systems	1.3.5, <b>1.3.1; 1.3.2; 1.3.3; 1.3.4</b>
G4	Applying 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	Using database languages to manipulate the databases	1.3.5, 1.3.7
G6	Discovering the quality of a given database scheme and practicing the methods to normalize a database scheme.	4.1.4
G7	Describing and defining integrity constraints in a database	1.3.5, 1.3.7
G8	Describing the future trends in database systems research	2.1.8
G9	Setting up and manipulating the database using a relational database management system	1.3.7

### 4. COURSE OUTCOMES

CO	Description	I/T/U
G1.1	Applying soft skills independently or in group to solve issues in database systems	U
G2.1	Practicing English reading comprehension skills to read textbooks and other documents related to database systems	U
G3.1	Explaining the role of databases in information systems and basic concepts about databases and database models	T
G3.2	Explaining advantages or disadvantages when organizing data in a database or using files	T

G4.1	Identifying all entities of the data component in a real-world application and the relationships between them.	T, U
G4.2	Constructing the entity relationship model and identify the cardinality and participation constraints	T, U
G4.3	Executing the obtained entity relationship model to corresponding relational database model.	T, U
G5.1	Operating on the databases using relational algebra language	T, U
G5.2	Operating on the databases using structured query language (SQL)	T, U
G5.3	Operating on the databases using relational calculus language.	T, U
G6.1	Explaining the concepts related to normal forms and quality of a database scheme	T
G6.2	Discovering the quality of the database schemes and enhancing the quality of them.	T, U
G7.1	Identifying all the integrity constraints existed in a given database	T
G7.2	Defining the integrity constraints in a relational database management system	T, U
G8.1	Describing the future trends in database systems research	I
G9.1	Setting up and manipulating the database using a relational database management system.	T, U
G9.2	Creating and manipulating the database using an interface programming language.	T, U

## 5. TEACHING PLAN

### THEORY

<b>ID</b>	<b>Topic</b>	<b>Course outcomes</b>	<b>Teaching/Learning Activities (samples)</b>	<b>Assessments</b>
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,	Lecturing, Discussion Chapter 14 [1]	HW3

		G6.1, G6.2		
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**

<b>ID</b>	<b>Topic</b>	<b>Course outcomes</b>	<b>Teaching/Learning Activities (samples)</b>	<b>Assessments</b>
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 (%)
<b>A1</b>	<b>Assignments</b>			<b>25%</b>
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%
<b>A2</b>	<b>Lab</b>			<b>30%</b>
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	5%
A22	Lab mid-term exam	In-class programming exam on computer Closed book exam	G1.1, G5.2, G7.2, G9.1	10%

ID	Topic	Description	Course outcomes	Ratio (%)
A23	Lab final exam	In-class programming exam on computer Closed book exam	G1.1, G5.2, G7.2, G9.1	15%
<b>A2</b>	<b>Exams</b>			<b>45%</b>
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	45%

## 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.
- **Assignments \* Lab \* Final Exam  $\geq 0$  && Total  $\geq 5$  && Final exam  $\geq 4/10$  to be passed.**
- 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.
- 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: [ABCD]<space>