

COURSE SYLLABUS
(Training level: Undergraduate)

Unit name:

Vietnamese name: Cơ sở dữ liệu

English name: Database

Unit code: BAD131

Major: Information Technology

Version: 2017

1. General information

- Credits: 03 (Theory: 02; Practice: 01)

- Types of knowledge:

General Education		Base core courses		Major core course		Concentration course		Others
Required <input type="checkbox"/>	Optional <input type="checkbox"/>	Information technology		Required <input type="checkbox"/>	Optional <input type="checkbox"/>	Required <input type="checkbox"/>	Optional <input type="checkbox"/>	
		Required <input checked="" type="checkbox"/>	Optional <input type="checkbox"/>					

- Required courses: Introduction to programming

- Prerequisite: None

- Co-requisite: None

- Facility requirements: Classroom with projectors.

- Practical room: SQL server version 2008 or above

- Departments in Charge: Department of Information Systems

2. Time Allocated

Total: 60 periods	Theory: 28 periods
	Discussion/Group presentation: 0/0
	Assignment/Essay/Practice: 0/0/28
	Tests: 4 periods: + Theory: Number of Tests: 02 Periods: 02. + Practice: Number of Tests: 01 Periods: 02
Self-study: 90 periods	
Other activities: 0 periods	

3. Lecturers' information

No	Lecturer's name	Phone number	Email	Note
1	MSc. Nguyen Thu Huong	0982734973	nthuong@ictu.edu.vn	Leader
2	MSc. Le Thu Trang	0983754948	lttrang@ictu.edu.vn	Member
3	PhD. Vu Duc Thai	0985158998	vdthai@ictu.edu.vn	Member
4	MSc. Ngo Thi Lan Phuong	0975272359	ntlphuong@ictu.edu.vn	Member
5	MSc. Nguyen Thi Tinh	0986060186	nttinh@ictu.edu.vn	Member
6	MSc. Ho Thi Tuyen	0966802169	httuyen@ictu.edu.vn	Member

4. Objectives

- The subject of Database Fundamentals belongs to the basic knowledge group of fields, aiming to provide students with basic knowledge about databases and their applications in building database systems for management information systems. This equips students with knowledge about data models, database architecture, relational data models, designing a database system, and knowledge about database management systems and operations to query databases.
- Creating foundational knowledge for subjects such as System Analysis and Design, Building Web Applications, Information System Management, Software Engineering, and Project Management.
- Meeting the Level 6 and Level 7 standards of the ICT curriculum for the Information Technology major.

5. Description of content and learning outcomes (using Bloom's taxonomy), with the following levels:

- **Knowledge standards:** (1) Remembering -> (2) Understanding -> (3) Applying -> (4) Analyzing, Evaluating -> (5) Creating and Developing.
- **Skills standards:** (1) Imitating -> (2) Practicing on your own -> (3) Mastering the standard through repetition -> (4) Combining multiple operations -> (5) Performing automatically without conscious thought.

Learning Outcomes Standard	Content	Level	
		Knowledge	Skills
C1	Understand the basic concepts of databases, database systems, data models, database management systems, relational data models, relationships, attributes, keys, and relational algebra.	2	
C2	Apply relational algebra to query data on relationships.	3	3
C3	Understanding basic concepts of function dependency, closure, minimal cover, minimal key, various normal forms, and algorithms in relational schema normalization.	2	
C4	Applying algorithms to normalize relation schemas	3	3

C5	Understand the statements used to define and manipulate data using SQL	2	
C6	Use SQL statements to define and manipulate data	3	3

6. Learning materials

- *Main curriculum:*

[1]. Department of Information Systems, (2015), *Lecture on Database*, University of Information and Communication Technology - Thai Nguyen University.

[2]. Department of Information Systems, (2015), *Database practical exercises*, University of Information and Communication Technology - Thai Nguyen University.

- *References:*

[3]. Le Tien Vuong, (2001), *Introduction to relational databases*, Statistical Publishing House. - Library

[4]. Vu Duc Thi, (1997), *Database textbook*, Statistical Publishing House. - Library

[5]. Nguyen Xuan Huy, (2003), *Database exercise*, Statistical Publishing House. - Library

[6]. Doan Thien Ngan (2007), *Basic SQL Programming*, Science and Technology Publishing House. - Library

[7]. Pham Huu Khang (2010), *SQL Server 2005 - Programming T - SQL*, Social Labor Publishing House. – Print version

[8]. Nguyen Nam Thuan (2010), *SQL Server 2005 Express*, Science and Technology Publishing House.

7. Learning outcomes assessment

- Score scale: 10.

- Component score:

Time	Component	Learning Outcome Standard	Weight	Score type	Final result percentage
During the duration of the course	Attendance: (point b_0)		1	$d=(b_0+b_1+b_2+b_3)/4$	30%
According to the teaching plan in section 9	Test 1: (point b_1)	C1; C2 C3, C4	1		
	Test 2: (point b_2)	C5, C6	1		
	Test 3: (point b_3)	C5, C6	1		
Final	Final exam	C1, C2, C3, C4,		Semester exam score: e	70%

Time	Component	Learning Outcome Standard	Weight	Score type	Final result percentage
During the duration of the course	Attendance: (point b_0)		1	$d=(b_0+b_1+b_2+b_3)/4$	30%
According to the teaching plan in section 9	Test 1: (point b_1)	C1; C2 C3, C4	1		
	Test 2: (point b_2)	C5, C6	1		
	Test 3: (point b_3)	C5, C6	1		
		C5, C6,			
Course summary score: (f)				$f = d \times 30\% + e \times 70\%$	

- Final exam format: Q&A

8. Regulations for students

8.1. Student's Duties

- Read materials and prepare for each lesson before attending class.
- Complete assigned assignments.
- Prepare practical content of the course.

8.2. Regulations on exams and academic studies

- Students must attend classes fully, ensuring at least 80% of class sessions.
- Complete the assigned tasks for the course.
- Participate in the full number of regular tests.

9. Detailed course content, lesson plan.

No	Periods	Learning content	Teaching methods	Learning Outcome Standard	Reference
1	3	<p>Chapter 1: Introduction to Databases (Total: 3; Theory: 3; TH: 0)</p> <p>1.1 Traditional file systems 1.2 Database system 1.2.1 Database definition</p>	<p>Presentation; State and solve the problem; Manipulate directly on the projector</p>	C1	<p>[1]. Chapter 1 [3]. Chapter 1 [4]. Chapter 1</p>

		<p>1.2.2 Components of the database system</p> <p>1.2.3 Architecture of the database system</p> <p>1.3 Advantages of building a database system</p> <p>1.4 Data independence</p> <p>1.5 Data Models</p>			
2	3	<p>Chapter 2: Relational Data Model</p> <p>(Total: 3; Theory: 3; Practice: 0)</p> <p>2.1 Properties</p> <p>2.2 Relationships</p> <p>2.3 Key of a relation</p> <p>2.4 Relational algebra operations</p> <p>2.4.1 Conjugation spells</p> <p>2.4.2 Intersection</p> <p>2.4.3 Subtraction</p> <p>2.4.4 Calculus of problems</p> <p>2.4.5 Projection</p> <p>2.4.6 Selection</p> <p>2.4.7 Connection</p> <p>2.4.8 Division</p>	<p>Presentation;</p> <p>State and solve the problem;</p> <p>Manipulate directly on the projector</p>	<p>C1</p> <p>C2</p>	<p>[1]. Chapter 2</p> <p>[3]. Chapter 2</p> <p>[4]. Chapter 2</p> <p>[5]. Chapter 2</p>
3	3	<p>Chapter 3: Database design theory</p> <p>(Total: 13; Theory: 12; Test: 1)</p> <p>3.1 Introduction to database design.</p> <p>3.2 Functional dependencies.</p> <p>3.2.1 Definition</p> <p>3.2.2 Types of Functional Dependencies</p> <p>3.2.3 Armstrong's axiomatic system</p> <p>3.3 Relationship diagram.</p> <p>3.4 Packaging.</p> <p>3.4.1 Closure of the set of functional dependencies</p> <p>3.4.2 Enclosure of the attribute set</p>	<p>Presentation;</p> <p>State and solve the problem;</p> <p>Manipulate directly on the projector</p>	<p>C3</p> <p>C4</p>	<p>[1]. Chapter 3</p> <p>[3]. Chapter 4</p> <p>[4]. Chapter 3</p> <p>[5]. Chapter 3</p>

4	3	<p>Chapter 3: Database design theory (Total: 13; Theory: 12; Test: 1)</p> <p>3.5 Key of the relation schema.</p> <p>3.5.1 Key definition of the relation schema</p> <p>3.5.2 Minimum key finding algorithm</p> <p>3.5.3 Algorithm to find all keys</p>	<p>Presentation; State and solve the problem; Manipulate directly on the projector</p>	<p>C3 C4</p>	<p>[1]. Chapter 3 [3]. Chapter 4 [4]. Chapter 4 [5]. Chapter 3</p>
5	3	<p>Chapter 3: Database design theory (Total: 13; Theory: 12; Test: 1)</p> <p>3.6. Coverage of the set of functional dependencies.</p> <p>3.6.1 Coverage definition of the set of functional dependencies</p> <p>3.6.2 Equivalence of Functional Dependencies</p> <p>3.6.3 Minimum Coverage Definition</p> <p>3.6.4 Algorithm for finding minimum coverage</p>	<p>Presentation; State and solve the problem; Manipulate directly on the projector</p>	<p>C3 C4</p>	<p>[1]. Chapter 3 [3]. Chapter 4 [4]. Chapter 4 [5]. Chapter 3</p>
6	3	<p>Chapter 3: Database design theory (Total: 13; Theory: 12; Test: 1)</p> <p>3.7 Normalize the relation schema</p> <p>3.7.1 Definition of Normal Forms</p> <p>3.7.2 Algorithm to recognize the highest normal form of a relation schema</p> <p>3.7.3 Algorithm to normalize a relational schema about 3NF</p> <p>3.8. Splitting a relation</p> <p>3.8.1. Define</p> <p>3.8.2. Check for lossless separation.</p>	<p>Presentation; State and solve the problem; Manipulate directly on the projector</p>	<p>C3 C4</p>	<p>[1]. Chapter 3 [3]. Chapter 4 [4]. Chapter 4 [5]. Chapter 3</p>

7	3	<p>Chapter 4: Definition and Data Manipulation Language (Total: 41; Theory: 10; Practice: 28; Test: 3)</p> <p>4.1 Introduction to database management systems</p> <p>4.2 Data Definition Language</p> <p>4.2.1. Syntax of T_SQL</p> <p>4.2.2 Command to create database</p> <p>4.2.3 Command to create database table structure.</p>	<p>Presentation; State and solve the problem; Manipulate directly on the projector</p>	<p>C5</p> <p>C6</p>	<p>[1]. Chapter 4</p> <p>[6]. Chapter 2;</p> <p>[8]. Chapter 3;</p> <p>[7]. Chapter 3</p>
		<p>Test #1 (written)</p>	<p>Teacher: Give the test</p> <p>Student: Take the test</p>	<p>C1, C2</p> <p>C3, C4</p>	
8	5	<p>Exercise #1 – Data Definition Language</p> <p>1.1. Experimental exercises</p> <p>1.2. Basic practical exercises</p> <p>1.3. Advanced practical exercises</p>	<p>Teaching: the teacher summarizes the content of the practice session</p> <p>Learning: Students install the math problems assigned by the teacher</p>	<p>C5</p> <p>C6</p>	<p>[2]. Exercise #1</p> <p>[7]. Chapter 3</p>
9	3	<p>Chapter 4: Definition and Data Manipulation Language (Total: 41; Theory: 10; Practice: 28; Test: 3)</p> <p>4.2.4 Command to edit database table structure</p> <p>4.2.5 Command to delete database structure</p> <p>4.2.6 Command to delete database table structure</p> <p>4.3 Data Manipulation Language</p> <p>4.3.1 Data query command</p>	<p>Teaching: the teacher summarizes the content of the practice session</p> <p>Learning: Students install the math problems assigned by the teacher</p>	<p>C5</p> <p>C6</p>	<p>[1]. Chapter 4</p> <p>[6]. Chapter 2;</p> <p>[8]. Chapter 3;</p> <p>[7]. Chapter 3</p>
10	5	<p>Exercise #2 – Practice Data Query</p> <p>2.1. Experimental exercises</p> <p>2.2. Basic practical exercises</p> <p>2.3. Advanced practical exercises</p>	<p>Teaching: the teacher summarizes the content of the practice session</p>	<p>C5</p> <p>C6</p>	<p>[2]. Exercise #2</p> <p>[7]. Chapter 3</p>

			Learning: Students install the math problems assigned by the teacher		
11	5	Exercise #3 – Practice Data Query 3.1. Experimental exercises 3.2. Basic practical exercises 3.3. Advanced practical exercises	Teaching: the teacher summarizes the content of the practice session Learning: Students install the math problems assigned by the teacher	C6	[2]. Exercise #3 [7]. Chapter 3
12	3	Chapter 4: Definition and Data Manipulation Language (Total: 41; Theory: 10; Practice: 28; Test: 3) 4.3.2 Nested query command	Teaching: the teacher summarizes the content of the practice session Learning: Students install the math problems assigned by the teacher	C5 C6	[1]. Chapter 4 [6]. Chapter 2; [8]. Chapter 3; [7]. Chapter 3
13	5	Exercise #4 – Advanced Data Query Practice 4.1. Experimental exercises 4.2. Basic practical exercises 4.3. Advanced practical exercises	Teaching: the teacher summarizes the content of the practice session Learning: Students install the math problems assigned by the teacher	C6	[2]. Exercise #4 [7]. Chapter 3
14	5	Exercise #4 – Advanced Data Query Practice 5.1. Experimental exercises 5.2. Basic practical exercises 5.3. Advanced practical exercises	Teaching: the teacher summarizes the content of the practice session Learning: Students install the math problems assigned by the teacher	C6	[2]. Exercise #5 [7]. Chapter 3

15	3	Chapter 4: Definition and Data Manipulation Language <i>(Total: 41; Theory: 10; Practice: 28; Test: 3)</i> 4.3 Data Manipulation Language (continued) 4.3.3 Data input command 4.3.4 Data update command 4.3.5 Data clear command	Teaching: the teacher summarizes the content of the practice session Learning: Students install the math problems assigned by the teacher	C5 C6	[1]. Chapter 4 [6]. Chapter 2 [8]. Chapter 3 [7]. Chapter 3
		Test # 2	Teacher: Give the test Student: Take the test		
16	5	Exercise #6. Practice on commands to enter, delete, and edit data 6.1. Example of practice 6.2. Basic practice 6.3. Advanced Practice	Teaching: the teacher summarizes the content of the practice session Learning: Students install the math problems assigned by the teacher	C5 C6	[2]. Exercise number 6
		Practice test – 2 periods	Teacher: Give the test Student: Take the test		

10. Approval Level:

August 27th, 2017

Vice Rector



PhD. Do Dinh Cuong

Dean




PhD. Nguyen Hai Minh

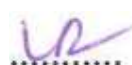
Head of Department



MSc. Nguyen Thi Thanh Nhan

Compilation team

Nguyen Thu Huong: 

Le Thu Trang: 

Vu Duc Thai: 

Ngô Thị Lan Phương: 

Nguyen Thi Tinh: 

Ho Thi Tuyen: 

11. Detailed outline update process

1st detailed outline update: <i>Day/month/year.</i>	Updater
2nd detailed outline update: <i>Day/month/year.</i>	Updater