

DISTRIBUTED DATABASES

1. Thông tin về học phần (General Information)

Tên học phần (Course name): Distributed databases

Mã học phần (Course code): INT1414

Số tín chỉ (Number of credits): 2

Loại học phần (Course type): Compulsory

Học phần tiên quyết (Prerequisites):

- Databases (INT1313)

Học phần trước (Previous courses):

Học phần song hành (Parallel courses):

Các yêu cầu đối với học phần (Course requirements):

- Lecture room: Projector, microphone and speaker, air conditioner.
- Laboratory:

Giờ tín chỉ đối với các hoạt động (Teaching and Learning hours):

- Lý thuyết (Lectures): 24h
- Bài tập (Exercises): 0h
- Bài tập lớn (Projects): 6h
- Thực hành (Lab): 0h
- Tự học (Individual reading): 0h

Địa chỉ Khoa/Bộ môn phụ trách học phần (Address of the Faculty/Department in charge of the course):

- Address: Faculty of Information Technology 1 - Posts and Telecommunications Institute of Technology, Km10, Nguyen Trai Street, Ha Dong District, Hanoi.
- Phone number: (024) 33510432

2. Mục tiêu học phần (Objectives)

Về kiến thức (Knowledge):

The aim of this course is to provide learners with important knowledge about distributed database systems, including:

- Basic concepts and fundamentals in distributed databases
- Applications of a distributed database system.
- Methods to design a distributed database system.

Kỹ năng (Skills):

The aims of this course are to equip learners with skills in:

- Designing a distributed database system.
- Implementation of a distributed database system in real world.

Thái độ, Chuyên cần (Attitude):

3. Tóm tắt nội dung học phần (Description)

This course provides learners with backgrounds on distributed database systems, including

basic concepts and fundamentals of distributed databases, design process and query processing, and applications of distributed databases. In addition, the course provides knowledge on distributed and concurrent transactions to the learners as well as advanced topics on distributed database systems.

4. Nội dung chi tiết học phần (Outlines)

Chapter 1: Introduction

- 1.1. Distributed database concepts
- 1.2. Applications of distributed database systems
- 1.3. Architecture of distributed database systems
- 1.4. Transactions in distributed database systems.
- 1.5. Examples of distributed databases

Chapter 2: Distributed database design

- 2.1. Top-down design process
- 2.2. Distributed database design issues
- 2.3. Fragmentation
 - 2.3.1. Horizontal fragmentation
 - 2.3.2. Vertical fragmentation
 - 2.3.3. Hybrid fragmentation
- 2.4. Allocation
- 2.5. Bottom-up design methodology
- 2.6. Data and access control
 - 2.6.1. View management
 - 2.6.2. Data security
 - 2.6.3. Semantic integrity control

Chapter 3: Query processing

- 3.1. Query processing problems and objectives
- 3.2. Complexity of relational algebra operations
- 3.3. Characterization of query processors
- 3.4. Layers of query processing
 - 3.4.1. Query decomposition
 - 3.4.2. Data localization
 - 3.4.3. Global query optimization
 - 3.4.4. Distributed query optimization
 - 3.4.4. Distributed query execution
- 3.5. Multidatabase query processing

Chapter 4: Transaction management and concurrency control

- 4.1. Concepts and properties of transactions
- 4.2. Types of transactions
- 4.3. Distributed concurrency control
 - 4.3.1. Taxonomy of concurrency control mechanism
 - 4.3.2. Concurrency control algorithms
 - 4.3.3. Deadlock management

Chapter 5: Advanced topics on distributed databases

- 5.1. Reliability of distributed database management systems
- 5.2. Data replication
- 5.3. Parallel database systems
- 5.4. Distributed object database management
- 5.5. Peer-to-peer data management
- 5.6. Streaming data and cloud computing

5. Học liệu (Textbooks)

5.1. Học liệu bắt buộc (Required Textbooks)

[1]. M.Tamer Ozsú and Patricie Valdúriez. *Principles of Distributed Database Systems*. Prentice Hall, 3rd edition, 2010.

5.2. Học liệu tham khảo (Optional Textbooks)

[2]. S.K Rahimi and F.S Houg. *Distributed Database Management Systems – A Practical Approach*. John Wiley & Sons, 2010.

6. Phương pháp, hình thức kiểm tra – đánh giá kết quả học tập học phần (Grading Policy)

Grading method	Percentage	Group/Individual
- Attendance	10%	Individual
- Exercises	10%	Individual
- Mid-term projects/exams	20%	Group or individual
- Final examination	60%	Individual

**Trưởng Bộ môn
(Head of Department)**

**Giảng viên biên soạn
(Lecturer)**

Phạm Văn Cường

Nguyễn Đình Hoá