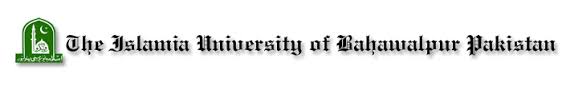
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**Department of computer science and information technology**

**Tentative course plan**

|  |  |
| --- | --- |
| **program** | **BS (Information Technology)** |
| **Semester** | **6th** |
| **shift** | **morning** |
| **Course Title** | **Distributed Database** |
| **Course code** | **IT-01604b** |
| **Credit hour** | **3** |
| **instructor** | **Mariam Akram**  **MS**  **Visiting faculty**  **Department of CS&IT, IUB**  **03407060564** |

**Course contents:**

Introduction to database and distributed database system, Background (relational Data model, computer networks), Distributed database design, Horizontal Fragmentation, Vertical Fragmentation, Database integration, Data and Access control, Introduction to transaction management, Distributed concurrency Control, introduction to Parallel Processing, Distributed Object Database Management system.

**Course overview:**

Use of distributed system has become a common practice in today’s computing environment especially with the easy access of the internet. Distributed Database system generally implemented in large organizations and need better understanding of the database and networking concepts. The emphasis in this course is on the design and management issues of a DDBS and on the implementation issue. The course starts with the basic definitions of DDBS and related concepts. The background concept of database system and networking are discussed. After the major architecture of the DDBSs and design issues of a DDBS are discussed. This part of DDBS design focused on the fragmentation and its types, Database integration. After that, data and access control and DDBS administration are discussed, like, transaction management and concurrency control. Advanced topic like parallel database and object Distributed Database are discussed.

**Learning outcomes:**

Upon successful completion of this course, student should be able to:

Understand major architecture of the DDBSs.

Understand design issues of a DDBS.

Understand fragmentation, Database integration.

Understand administration issues of DDBS, like transaction management and concurrency control.

Understand parallel database, object distributed database.

**SEQUENCE OF TOPICS TO BE COVERED**

|  |  |  |
| --- | --- | --- |
| Proposed Date | Topic | Lectures |
| Week 01 | Introduction to Distributed Database Systems and History,  Distributed Computing, Objectives, Theoretical Aspects | 1 |
| Definition of distributed database system, compulsory part ,  main charcteristic, objectives, Distributed DBMS  and decentralized database | 2 |
| Week 02 | Resembling Setups, Reasons for DDBS and Promises of  DDBMS | 3 |
| Complicating factors, design issue | 4 |
| Week 03 | Background of RDBMS, Relational Data Model Key, Tables, normalization | 5 |
| Dependencie Structure, Relational Data Languages | 6 |
| Week 04 | Derived Relational Calculus, computer networks | 7 |
| DDBS Architecture, Dimensions, Architectural Alternatives | 8 |
| Week 05 | DDBS Architecture | 9 |
| Distributed database design, distributed design issue, | 10 |
| Week 06 | Distributed design issues, Fragmentation (Horizantal  Fragmentation) | 11 |
| Primary horizontal fragmentation | 12 |
| Week 07 | Derived horizontal fragmentation, checking for correctness | 13 |
| Vertical fragmentation, information requirement of vertical fragmentation | 14 |
| Week 08 | clustering algorithm | 15 |
| Hybrid fragmentation , allocation requirement , model model | 16 |
| Week 09 Mid Term Examination | | |
| Week 10 | Database integration, bottom up design | 17 |
| Week 10 | Schema Matching, schema heterogeneity | 18 |
| Week 11 | Linguistic Matching, constraint based matching | 19 |
| Learning –based matching, Schema integration | 20 |
| Week 12 | Schema Mapping | 21 |

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| Week 12 | View management, view in centralized DBMS, View in  Distributed DBMS, materialized view Maintenance | 22 |
| Week 13 | Data security, Discretionary Access control, Multilevel Access Control, Distributed Access control | 23 |
| Semantic integrity control, centralized semantic integrity  control. | 24 |
| Week 14 | Distributed semantic integrity control | 25 |
| Transaction management (definition of transaction,  Termination condition of transaction, characterization of  transactions, properties of transaction),Types of transaction  (flat, nested, workflows). | 26 |
| Week 15 | Transaction Processing issues, architecture revisited,  centralized & distributed transaction execution. | 27 |
| Concurrency control, Serializability theory, locking –  Based concurrency control algorithm. | 28 |
| Week 16 | Timestamp-based concurrency control algorithm | 29 |
| Optimistic concurrency control algorithm, deadlock management | 30 |
| Week 17 | Parallel database system: objectives, functional  Architecture, parallel DBM architectures | 31 |
| Distributed object database management:  Fundamental concepts, object distribution design, architectural issues. | 32 |
| Final Term Examination | | |

**Reference Book:**

**Book Title:** Principles of Distributed Database Systems

**Author:** M.Tamer Ozsu, Paterick Valduriez

**Edition:** 3rd Edition

**Student evaluation criteria:**

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| --- | --- |
| Attendance | 5% |
| Assignment | 5% |
| Surprise Test/Quizzes | 5% |
| Presentation | 5% |
| Mid Term Examination | 30% |
| Final Term Examination | 50% |
| **Total** | **100%** |

Mariam Akram

Visiting faculty

(Course instructor)