**Debre Markos Institute of Technology**

**Information Technology Academic Program**

**Course Title:** Advanced Database Systems

**Course Code:** InTc2110

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**Course Description**

This course covers file organizations, storage management, query optimization, transaction management, recovery, and concurrency control, database authorization and security.

**Course Objectives**

At the end of this course the students will be able to:

* Understand the database query processing and optimization
* Know the basics of transaction management
* Understand database security
* Use different recovery methods when there is a database failure
* Design a distributed database system

**Course outline**

**Chapter 1:** **Transaction Processing Concepts**

* Introduction
* Transaction and System Concepts
* Properties of Transaction
* Schedules and Recoverability
* Serializability of Schedules

**Chapter 2: Concurrency Control Techniques**

* Locking Techniques for Concurrency Control
* Concurrency Control Based on Timestamp Ordering
* Validation (Optimistic) Concurrency Control Technique

**Chapter 3: Database Recovery Techniques**

* Recovery Concepts
* Recovery Concepts Based on Deferred Update
* Recovery Concepts Based on Immediate Update
* Shadow Paging

**Chapter 4: Query processing and Optimization**

* Translating SQL Queries into Relational Algebra
* Basic Algorithms for Executing Query Operations
* Using Heuristic in Query Optimization

**Chapter 5: Database Security and Authorization**

* Introduction to DB Security Issues
* Discretionary Access Control
* Mandatory Access Control for Multilevel Security
* Statistical DB Security

**Chapter 6: Distributed Database System**

* Distributed Database Concepts
* Data Fragmentation, Replication, and Allocation Techniques
* Types of Distributed Database Systems

**Chapter7: Data warehouse: Students Assignment Reading**

**Assessment**

Assignments ………10%

Mid Tests……….. 30% (ch1, ch2 and ch3)

Final examination ……50% (ch4, ch5 and ch6)

Project and Lab Exercise ……………10%

**Reference**

**Text Book**

* Elmasri et al (2004). Fundamentals of Database Systems, 4thed, Pearson education

**References**

1. Thomas M. Connolly and Carolyn E.Begg. (2012). A step by step approach to building databases, 2nded.Pearson Education Limited.
2. Ramon A ,etal. Shaum’s outlines, fundamentals of relational databases