

# Database Systems Qualifier Exam

Department of Computer Science  
Georgia State University

## Syllabus

### Topics:

1. Introduction
  - Database System Concepts and Architecture
2. Data Modeling using ER and EER Models
  - Entities and Relationships
  - ER Diagrams
  - Sub Classes, Super classes, and Inheritance
  - Specialization and Generalization
  - Aggregation
3. Relational Data Model
  - Relations and Constraints
  - Relational Algebra, Relational Calculus
  - Datalog
  - Relational to ER and EER mappings
  - SQL
  - Relational database design – functional dependencies and normal forms
  - Query processing and Optimization
4. Object-Oriented Data Model
  - Object Oriented Concepts
  - Object Database standards and Languages: ODL and OQL
  - ER to Object Database mappings
5. XML Data Model
  - XML Syntax
  - DTDs and XML Schema
  - XPath and XQuery
6. Transaction Processing Concepts and Concurrency Control Techniques
  - ACID properties
  - Two Phase locking techniques
7. Deductive Databases
  - Minimal model semantics, Fixpoint semantics, SLD resolution
  - Negation in deductive databases

## **Reading List**

1. Elmasri and Navathe, Fundamentals of Database Systems, 5<sup>th</sup> edition, Addison Wesley, 2007.
2. Ullman and Widom, First Course in Database Systems, 2<sup>nd</sup> edition, Prentice Hall, 2001.
3. Raghu Ramakrishnan, Database Management Systems, McGraw Hill, 2002.