CS 503: Advanced Databases (3-0-0: 3)

Introduction: Review of basic concepts of DBMS and Its types.

Buffer management: Goals and importance of buffering, Buffer implementation, Global buffering schemes (FIFO, CLOCK, LFU, LRU, LRU-K).

Data-store organization and Record Identification: Inverted-file organization, Physical representation of attributes, Physical representation of tuples, Internal organization of data pages, Mapping short records onto pages, Mapping long records onto pages, Storage allocation and free-space management.

Database recovery and Concurrency control: Concept of a transaction, Transaction recovery, Physical recovery schemes, Bad dependencies, Locks and implementation of different types of lock, OLAP.

Distributed databases: Date's requirements for distributed data management, Problems of distributed database management, Object naming, Data-dictionary management, Data fragmentation, Distributed query processing and optimization, Global transactions, Heterogeneous databases and Mobile/Disconnected databases. Data management problems and solutions for non-traditional applications, such as E-commerce, engineering, internet, intranet, etc.

Data replication: Objectives and requirements of data replication, Replication schemes, Synchronous, Periodic state-based replication, Asynchronous replication, Symmetric replication, Evaluation of different replication schemes.

Research Topics in Database Systems, Data Warehouse, Knowledge Management, Multidimensional joins etc.

Reference Books:

1. Raghu Ramakrishnan Database Management Systems, 3rd Edition, 2003.
2. J.D. Ullman, Principles of Database and Knowledge Base Systems, Vol I & II, Computer Science Press, 1989.
3. RiniChakrabarti, Advanced Database Management System, First Edition, Wiley, 2014.
4. Ozsu, Principles of Distributed Database Systems, 2nd Edition, PEARSON, 2006.
5. Saeed K. Rahimi, Frank S. Haug, Distributed Database Management Systems: A Practical Approach, Wiley, 2014.
6. Jeremy D. Zawodny, Derek J. Balling, High Performance MySQL: Optimization, Backups, Replication, Load Balancing, OREILLY, 2008.
7. In addition research papers and conference proceedings shall be used -
    - Distributed Database Management Systems (Coronel, Morris, and Rob Chapter 12).
    - Business Intelligence and Data Warehouses (Coronel, Morris, and Rob Chapter 13)
    - Database Connectivity and Web Technologie

- Thomas M. Connolly, Carolyn Begg, Database Systems: practical approach to design, implementation, and management, Pearson Education Limited, (6th edition), 2015.
- Melton, J., & Simon A., SQL 1999, Understanding Relational Language Components, Morgan -Kaufmann, 2003.