CS6302
Heterogeneous and mobile databases
Spring Semester 2016

Course Policies

Academic Alert System The purpose of the Academic Alert System is to improve the overall academic success of students by improving communication among students, instructors and advisors; reducing the time required for students to be informed of their academic status; and informing students of actions necessary by them in order to meet the academic requirements in their courses.

Disabilities If you have a documented disability and anticipate needing accommodations in this course, you are strongly encouraged to meet with the instructor as early as possible in the semester. You will need to request that the Disability Support Services staff send a letter to the instructor verifying your disability and specifying the accommodation you will need before the instructor can arrange your accommodation. Disability Support Services is located in 204 Norwood Hall, their phone number is 341-4211, and their E-mail is dss@mst.edu.

Academic Dishonesty Every student enrolled in this course is expected to be familiar with Missouri S&T's Student Academic Regulations, including the section on *Conduct of Students* which on pages 30-31 defines several forms of *Academic Dishonesty* such as *cheating*, *plagiarism*, and *sabotage*. Incidences of Academic Dishonesty will typically result in zero grades for the respective course components, notification of the student's advisor, the student's department chair, and the campus undergraduate studies office, and further academic sanctions may be imposed as well in accordance with the regulations. Note that those who allow others to copy their work are just as guilty of plagiarism and will be treated in the same manner.

Course Description:

The conventional notion of timely and reliable access to global information sources is rapidly changing. Users have become much more demanding in that they desire and sometimes even require access to information "anytime, anywhere." The extensive diversity in the range of information that is accessible to a user at any given time is also growing at a rapid rate. Furthermore, rapidly expanding technology is making available a wide breadth of devices with different memory, storage, network, power, and display requirements to access this diverse data set.

Classical distributed database systems monolithically offer distribution transparency and higher performance. However, with the advances in technologies this monolithic approach is insufficient. In the new computational environment data distribution issue has been evolved to the data integration from several heterogeneous databases.

Multidatabases are designed to deal with this issue. They are designed to allow timely and reliable access to large amount of heterogeneous and autonomous data sources in an environment that is characterized as "sometime, somewhere." Within the scope of these systems, multidatabase researchers have addressed issues such as autonomy, heterogeneity, transaction management, concurrency control, transparency, and query resolution. These solutions are based upon fixed clients and servers connected over a reliable network infrastructure. However, the concept of *mobility*, where a user accesses data through a remote

connection with a portable device, has introduced additional complexities and restrictions in a multidatabase system. These include:

- A reduced capacity network connection,
- Processing and resource restrictions, and
- Effectively locating and accessing information from a multitude of sources.

A multidatabase system (MDBS) with such additional restrictions is called a mobile data access system (MDAS).

This course extensively discusses multidatabase systems and mobile data access systems. It will articulate traditional distributed database issues within the framework of MDBSs and MDASs, and relates these issues to the research challenges in “big data” arena.

CS46302
Heterogeneous and mobile databases

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Text: *Reading papers and class notes available at* http://cs.mst.edu/hurson/index.html

Outline:

1) Introduction
2) Database System architectures
3) Distributed Database systems
   a. Query Processing
   b. Transaction processing
   c. Recovery and Concurrency control
   d. Security
4) Multidatabases
   a. Definition
   b. Issues in multidatabase systems
   c. Approaches to multidatabase systems
   d. Query Processing
   e. Transaction Processing
   f. Recovery and Concurrency Control
   g. Security
5) Mobile Data Access systems
   a. Mobility issues
   b. On-demand services
   c. Broadcast services
   d. Transaction Processing
   e. Security
6) Big Data
   a. What is it?
   b. Challenges
   c. Potential solutions

Administrative (no make up exam)

Home-works	10%	
Project	20%	
Exams & Quizzes	35%	
Final Exam	35%	(Comprehensive)

Tentative course schedule CS6302

Major Topic	Class notes	Date
Database architecture	Module 1, page 1-26	Jan. 20
	Module 1, page 27-53	Jan. 22
	Module 1, page 54-84	Jan. 25
	Module 1, page 85-95	Jan. 27
Discussion on Module1, Distributed Databases (Query processing)	Module 2, page 1-25	Jan. 29
Test Module1	Module 2, page 26-36	Feb. 1
	Module 2, page 37-52	Feb. 3
	Module 2, page 53-74	Feb. 5
Discussion on Module2, Distributed Databases (Transaction processing)	Module 3, page 1-9	Feb. 8
Test Module2	Module 3, page 10-31	Feb. 10
	Module 3, page 32-51	Feb. 12
	Module 3, page 52-78	Feb. 15
	Module 3,	Feb. 17
Discussion on Module3, Multidatabases	Module 4, page 1-24	Feb. 19
Test Module3	Module 4, page 25-41	Feb. 22
	Module 4, page 42-65	Feb. 24
	Module 4, page 66-86	Feb. 26
	Module 4, page 87-110	Feb. 29
	Module 4, page 111-126	March 2
	Module 4, page 127-155	March 4
Discussion Module4, Query processing in Multidatabases	Module5, page 1-20	March 7
Test Module4	Module 5, page 21-37	March 9
Discussion Module5, Security in Multidatabases	Module 6, page 1-25	March 11
Test Module5	Module 6, page 26-59	March 14
Catch up		March 16
No class		**March 18**
Discussion Module6, Database Mobility	Module 7, page 1-20	March 21
Test Module6	Module 7, page 21-34	March 23
	Module 7, page 35-54	March 25
No class		**March 27**
Discussion Module7, Transaction Processing	Module 8, page 1-16	April 4
Test Module7	Module 8, page 17-42	April 6
Discussion Module8, Broadcasting	Module 9, page 1-23	April 8
Test Module8	Module 9, page 24-44	April 11
	Module 9, page 45-68	April 13
	Module 9, page 69-83	April 15
	Module 9, page 84-107	April 18
	Module 9, page 108-120	April 20
	Module 9, page 121-138	April 23
	Module 9, page 139-150	April 25
	Module 9, page 151-173	April 27
Discussion Module9, Big data	Module 10, page 1-15	April 29
Test Module9	Module 10, page 16-32	May 2
		May 4