



**University of Tehran**  
**School of Electrical and Computer Engineering**

<b>Course</b>	Advanced Database 2		
<b>Course type, level, credit</b>	Optional	Graduate	3 units
<b>Field, Major</b>	Computer Engineering	Software and Information Technology	
<b>Co-requisite(s)</b>	-		
<b>Prerequisite(s)</b>	Database Management Systems, Advanced Database 1 (Optional / Recommended)		
<b>Prerequisite by topic</b>	Understanding of Database Systems and Operating Systems		
<b>Goals</b>	This course is intended to focus on Hot Topics and Special issues regarding the recent advances in research and development in Database Management Systems and the related infrastructures.		
<b>Outcome</b>	Students will be capable of understanding the latest advanced topics in Database Management Systems, and to expertise the challenging issues in research projects as well as in development industrial projects.		
<b>Topics</b>	<ul style="list-style-type: none"> <li>- Performance Tuning and Benchmark</li> <li>- Standardization and Legacy Systems</li> <li>- Spatial and Temporal Databases</li> <li>- Multimedia and Mobile Databases</li> <li>- TP Monitors and Workflows</li> <li>- Main Memory Databases</li> <li>- Database Integration</li> <li>- Peer-to-Peer Data Management</li> <li>- Web Data Management</li> <li>- Stream Data Management</li> <li>- Cloud Data Management + NoSQL</li> <li>- Map-Reduce, Hadoop, Pig</li> <li>- Distributed Stream Computing</li> <li>- Hyracks: Data-Intensive Computing</li> <li>- Bigtable: Dist. Storage for Structured Data</li> <li>- Pregel: Large-Scale Graph Processing</li> <li>- Graph Databases</li> </ul>		
<b>Required software</b>			
<b>Assignments</b>	Home works and Multiples Paper reviews		
<b>Projects</b>	Benchmarks related to course topics		
<b>Grading</b>	Assignments and quiz: 20 % Project: 10%		

	Midterm exam: 30 % Final exam: 40 %
<b>Textbook(s)</b>	<ol style="list-style-type: none"> <li>1- Silberschatz, Korth, and Sudarshan. Database system concepts. McGraw-Hill, 6th edition, 2010.</li> <li>2- Özsu, M. Tamer, and Patrick Valduriez. Principles of distributed database systems. Springer Science &amp; Business Media, 2011.</li> <li>3- Leskovec, Jure, Anand Rajaraman, and Jeffrey David Ullman. Mining of massive datasets. Cambridge University Press, 2014.</li> </ol> <p>+ Selected topics from other references :</p> <ol style="list-style-type: none"> <li>4- Stoica, Ion, et al. "Chord: a scalable peer-to-peer lookup protocol for internet applications." IEEE/ACM Transactions on Networking (TON) 11.1 (2003): 17-32.</li> <li>5- Yang, B. Beverly, and Hector Garcia-Molina. "Designing a super-peer network." Data Engineering, 2003. Proceedings. 19th International Conference on. IEEE, 2003.</li> <li>6- Dean, Jeffrey, and Sanjay Ghemawat. "MapReduce: simplified data processing on large clusters." Communications of the ACM 51.1 (2008): 107-113.</li> <li>7- Latin, Pig. "A Not-So-Foreign Language for Data Processing C." Olston, B. Reed, U. Srivastava, R. Kumar and A. Tomkins. ACM SIGMOD 2008 International Conference on Management of Data, Vancouver, Canada. 2008.</li> <li>8- Neumeier, Leonardo, et al. "S4: Distributed stream computing platform." 2010 IEEE International Conference on Data Mining Workshops. IEEE, 2010.</li> <li>9- Borkar, Vinayak, et al. "Hyracks: A flexible and extensible foundation for data-intensive computing." 2011 IEEE 27th International Conference on Data Engineering. IEEE, 2011.</li> <li>10- Chang, Fay, et al. "Bigtable: A distributed storage system for structured data." ACM Transactions on Computer Systems (TOCS) 26.2 (2008): 4.</li> <li>11- Malewicz, Grzegorz, et al. "Pregel: a system for large-scale graph processing." Proceedings of the 2010 ACM SIGMOD International Conference on Management of data. ACM, 2010.</li> </ol>
<b>Further readings</b>	Reviews of selected papers from: <ol style="list-style-type: none"> <li>1. Proceedings of the VLDB Endowment, Vols 8-9, 2015-2016</li> <li>2. International Journal on Very Large DB, Vols 24-25, 2015-2016.</li> <li>3. ACM Trans. on Database Systems, Vols 40-41, 2015-2016</li> <li>4. Proc. of ACM SIGMOD Int. Conf. on Man. of Data, 2016</li> </ol>

