INLS 692-223
Advanced Databases
Fall 2014
Thursday, 2:00 – 4:45pm, Manning 001
(October 2-November 20)

Instructor:
Arcot Rajasekar
Office: Manning 021
Office Hours: 12:45 – 1:45 pm Thu, and by appointment
Email: rajasekar at unc dot edu

Course Description: In this course we study concepts in database planning and administration. Topics include relational database configuration, administration and monitoring, security, performance tuning and disaster recovery. We will also touch upon emerging concepts in NoSQL database and Hadoop administration.

Prerequisite(s): INLS 623 – Database Systems II or equivalent

Textbook (required):
Fundamentals of Database Systems, Sixth Edition
Elmasri, R. and Navathe, S.B., Pearson Addison Wesley.
(5th edition is also okay – but chapters are moved around)

Grading Scheme:
1. Class participation 10%
2. Blog participation 10%
3. Journal 15%
4. Homeworks & Projects 40%
5. Final exam 20%

1. Course Objectives
- Advanced concepts and issues in database design and administration
- Hands on Relational Database administration and monitoring (PostgreSQL)
- Hands on NoSQL Database Administration (Cassandra or MongoDB)

2. Hardware and Software Requirements
You will be installing and administering a relational database and a NoSQL database on your own laptop.
3. Graded Work

Your grade will be based on class and blog participation, keeping a journal, a technology paper and presentation, and through projects, homeworks and a final exam, weighted as shown under “Grade Weighting” on the first page.

**Participation**

I require all students to participate actively in class discussions throughout the class. At the beginning of each class, we will have a common discussion period, where we will discuss current events related to topics in the course. I expect that every student reads the ‘required reading’ list, posted at least a week before the class. As the class proceeds, I will be looking for questions, comments and a lively dialogue on the presented material as well as on the required reading materials. Apart from class participation, I also expect students to actively participate in blog posts on topics related to the course. Sometimes I will start a thread of conversation, but I also expect students to take initiative in starting new threads of discussions. The sakai site has facilities for blogs. I have also turned on the chat feature for our course in sakai to enable interactive discussions. There will be no homework – apart from the assigned reading list.

**Journal**

Each student is expected to maintain a journal. This is something of a personal digital library where one will keep all materials related to this course, gathered in the course or elsewhere. I expect material beyond the reading list to be part of your journal. Current events and class discussion topics can also be part of your journal. I also expect tags, metadata and your own commentary added for each material as an outcome of your reading the material. I would strongly recommend the use of the SILS Lifetime Library (http://lifetime-library.ils.unc.edu/) for maintaining the journal as it allows controlled sharing. Please make the material readable by me so that I can evaluate the progress. This journal will be a persistent digital library that may help you later after the course and which you can grow as you gather more relevant material.

**Homework and Project work**

I am planning on a series of home works and projects with PostgreSQL and Cassandra or MongoDB. More information will be available as the course proceeds.

**Exam**

There will be one final exam.

4. Grading Policies

The following grade scale will be used AS A GUIDELINE (subject to any curve):

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<th>Graduate Percentage</th>
<th>Undergraduate Percentage</th>
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<tbody>
<tr>
<td>H 100-95%</td>
<td>A 100-90%</td>
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<tr>
<td>P+ 94-90%</td>
<td>B 89-80%</td>
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<tr>
<td>P 85-89%</td>
<td>C 79-70%</td>
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<tr>
<td>P- 80-84%</td>
<td>D 69-60%</td>
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<td>L 70-79%</td>
<td>F Below 60%</td>
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<td>F Below 70%</td>
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This scale will be used as a GUIDELINE ONLY. The final grade scale may differ.
Due Dates and Late Work
Each assignment will have a due date and time and will include instructions for submission. Late submissions will not be given any credit if submitted after graded assignments or solutions have been released. Typically, a late penalty of 10% per day will be applied unless prior arrangements have been made with the instructor.

Requests for Extensions and Absences
Any request for an extension must be made, preferably by email, at least 24 hours prior to the due date. Written documentation is required for illness. If a serious illness prevents you from taking any of the tests, send your instructor an e-mail message, or a friend with a note, describing your condition before the scheduled test. Also, to establish a valid excuse for an illness you must get a note from a physician or the University infirmary. Before missing a test for any reason, you must make every effort to discuss the problem with your instructor before the day of the test.

Statute of Limitations
Any questions or complaints regarding the grading of an assignment or test must be raised within one week after the score or graded assignment is made available (not when you pick it up).

5. Course Communication (Sakai)
Sakai-based course website has been set up and it is the responsibility of every student to check the Sakai website regularly for announcements and materials. The Announcements section of the website will be the source for all official announcements related to the class. Your instructor may announce tests, assignments, or changes to assignments in class, but there is no guarantee or promise that such announcements will be made in class. The Announcements section of the website is the only official, reliable source for announcements, changes, etc. from the instructor. If something the instructor says in class conflicts with information posted by the instructor on the website, then the information posted on by the instructor on the Sakai website takes precedence. Verbal instructions are easily misinterpreted, and they do not leave a documentation trail. All students should be able to access the system.

6. Honor Code
The UNC Honor Code is in effect for all work in this course. When work or ideas are not your own, you must attribute them. Unless otherwise stated, all assignments in this class are individual assignments, meaning that the substance of the work you turn in must be your own. If you have any doubts or questions about a course of action or a specific situation, please ask for clarification. Students should NOT receive (or give) major creative assistance or ongoing minor support on individual assignments. If you have any questions about this, please ask me.

7. Special Accommodations
If any student needs special accommodations, please contact the instructor during the first week of classes.
## 8. Tentative Timeline

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<th>No.</th>
<th>Date</th>
<th>Topic</th>
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<tbody>
<tr>
<td>1</td>
<td>10/02</td>
<td>Intro to Advanced Database Systems</td>
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| 2   | 10/09 | Transactions
Installation, Administration and Monitoring of RDB              |
| 3   | 10/16 | Serializability
Administration & Performance Tuning of RDB                        |
| 4   | 10/23 | Schedules, Locks & Deadlocks
Extensions, Locking and Lock Recovery in RDB                          |
| 5   | 10/30 | Statistics, Query Optimization
Query Planning                                                             |
| 6   | 11/06 | Failure & Disaster Recovery of RDB
Disaster Recovery Administration                                           |
| 7   | 11/13 | NoSQL databases
NoSQL Administration                                                       |
| 8   | 11/20 | More NoSQL & Exam                                                     |