CS422 COURSE ASSIGNMENTS

**Week 1 :**

**Monday :**

Lesson 1 – Introduction to DBMS.

Readings : Pages 3 - 32. Do NOT spend a lot of time on details.

Write three STC points clearly relating what you have read to STC principles.

The advice for writing academic work is “Clear Connections, Stern Logic, Utter Simplicity”.

Install SQL-Server. Mac users should install MySQL. **Look at my instruction file**!

If time allows : When you are done with the above Read pages 35 – 45; 49 (bottom) – 55.

Optional : Read pages 46 – 49.

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**Tuesday :**

# Lesson 2 - The Entity-Relationship model

Readings : Pages 357 – 375 (middle); 376 (bottom) – 382.

Study the figure on page 359.

Hand in the following : Page 383 - 12.3, 12.8, 12.10 (all), 12.12 (all).

Optional : If time allows read pages 385 – 392; 397 (middle) – 400 (top).

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**Wednesday :**

Lesson 3 : The Relational Model

Readings : Pages 101 – 106; 108 (bottom) – 118..

Skim pages 107 – 108.

**Hand in the following : Page 118 - 4.1 (all), 4.4, 4.5, 4.6, 4.7, 4.8, 4.9.**

Read pages 119 –128; page 132; 138 (middle) – 139.

Optional : Read page 133.

**Hand in the following : Page 139 - 5.1, 5.8 (a – d).**

If you have extra time : Generate the Relational algebra only for page 140 – 5.12 (a – e).

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**Thursday :**

Lesson 4 - SQL

Readings : Pages 143 – 182. The above is a lot of reading, But it is Very Important since it will

teach you SQL! Take two days to read this if you need to!

Lab : Check **ALL** results that you get!

Page 182 – 6.5, 6.7 through 6.19 (time very well spent learning SQL), 6.22 through 6.24

Lab : Page 183 – 6.27, 6.28.

Lab Level 3 : Page 183 – 6.20, 6.21, 6.25, 6.26.

Extra Credit : Page 183 – 6.29.

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**Friday :**

Lesson 5 - SQL

Readings : Pages 185 – 188; 192 – 196 (middle); 219 – 220.

If have time read : 188 – 190; 197 – 207; 210 (middle) – 213 (top).

Only if you have time do : Page 220 – 7.10; 7.11; 7.12; 7.13; 7.14.

Extra Credit : Page 221 – 7.20; 7.21; 7.22.

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**Week 2 :**

**Monday :**

Lesson 6 – Normalization.

Readings : Pages 403 – 413 (bottom); 415 (top) – 427.

Hand in the following : Page 427 – 14.4, 14.10, 14.11, 14.14, 14.15, 14.16.

**Extra Credit :**

Readings : Pages 433 – 434 (middle); 437 – 447; 450.

Skim (read briefly) pages 434 (middle) – 437 (top); 447 (bottom) – 450.

Hand in the following : Page 451 – 15.6, 15.7, 15.9.

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Lesson 8 - Mapping Between ER and Relational Models

Readings : Pages 455 – 459; 479 – 493; 495 (bottom) – 496 (top);

chapter summary at page 508.

If you have time read pages 460 – 476.

Extra Credit : Summarize some of the main points of the above optional reading.

If you have time read pages 494 – 495.

**You should hand in the following : Page 509 – 17.2 (a, b, c, d, g, i); 17.3; 17.8.**

Extra Credit : Page 509 – 17.6.

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Lesson 9 : Physical Database Design.

Readings : Pages 513 – 536.

Hand in the following : a) Page 536 – 18.3, 18.4.

b) Why do we need to analyze transactions at the physical

database design level?

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Readings : Pages 537 – 548.

Optional : Read pages 549 – 555.

Hand in the following : a) Page 555 – 19.2.

b) When should we consider denormalization?

c) What are some of the disadvantages of denormalization?

d) 1) What is ‘partitioning relations’?

2) When would you use it?

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Lesson 10 : Transactions.

Readings : Pages 619 – 630 (middle); 633 (bottom) – 640 (top); 641; 644;

649 (bottom) – 651 (middle); 652 (bottom) – 655 (top);

656 (middle) – 659 (middle); 674 (middle) – 675.

Skim pages 642 – 644 (top).

Optional : If you have time read the pages I skipped in the above readings.

Hand in the following : a) Page 675 – 22.1, 22.2, 22.3, 22.4, 22.5, 22.9, 22.13,

22.18 (a, c, d, e) (ONLY do conflict serializable

and recoverable) (change every ‘abort’

to a ‘commit’); 22.19 (a, c, d, e).

b) What is a checkpoint?

c) What is a lock?

d) What is 2PL?

e) What is deadlock?

f) What is meant by granularity? Give examples.

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Lesson 13 : Data Warehousing,OLAP and Data Mining.

Readings : Pages 1175 – 1186; 1192(Parallel DBMSs); 1194(31.4) – 1195;

1209 – 1212(middle); 1213(32.4) – 1215(middle).

Optional : If you have time read pages 1187 – 1194; 1215 – 1217.

Hand in the following : a) Page 1206 – 31.2, 31.3, 31.11.

b) Page 1233 – 32.4.

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Readings : Pages 1237 – 1243; 1252 – 1259; 1267 – 1269(middle).

Optional : If you have time read pages 1244 – 1251; 1260 – 1265; 1269 – 1277(middle).

Hand in the following : a) Page 1265 – 33.1, 33.2.

b) Page 1280 – 34.1, 34.2, 34.6.

Extra Credit : 1) Investigate the ROLLUP and CUBE operators in SQL Server 2008.

2) Create some data (or use data that you have) to experiment with

the ROLLUP and CUBE operators in SQL Server 2008.

3) Investigate Business Intelligence capabilities on SQL Server 2008.

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Lesson - NOSQL and MONGODB.

Do the below problems from (previously used SQL) the first week, but now use MongoDB to solve

these problems, using **JSON**. You will need to RE-DESIGN the original four tables so that the

data can be used efficiently by MongoDB. You will end up with LESS than four tables.

Lab : Check **ALL** results that you get!

Page 182 – 6.5, 6.7 through 6.19 (time well spent learning MongoDB), 6.22 through 6.24

Lab : Page 183 – 6.27, 6.28.

Lab Level 3 : Page 183 – 6.20, 6.21, 6.25, 6.26.

Extra Credit : Page 183 – 6.29.

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Lesson 14 : Distributed Databases.

Readings : Pages 737 – 748; 753 – 779.

Hand in the following : a) Page 780 - 24.1, 24.2, 24.3, 24.4, 24.5, 24.7, 24.9, 24.10,

24.11, 24.12, 24.13.

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Do the homework on ‘String functions’.

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Extra Credit Homework -Lesson : Query Processing.

Readings : Pages 679 – 685, 687 (Simplification) – 689, 693 (23.3.2) – 696 (middle (skim table

23.1)), 712 (23.5) – 713, 718 (23.5.6) – 719 (top), 731 – 732.

Skim read pages 690 – 693 (top), 696 (middle) – 708, 713 (bottom) – 716.

Hand in the following : Page 732 – 23.1, 23.3, 23.8, 23.9, 23.12, 23.17.

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Extra Credit Homework -Lesson : Objects in the Database.

Readings : Pages 243 – 246(middle); 249(9.2) – 250; 253(Impedance Mismatch);

254(9.3) – 256(top); 257(9.4) – 268; 292; 891 – 898; 903(27.2.3) – 905; 926 – 931.

Optional Readings - Read parts of the OO chapters that we skipped above.

Hand in the following : Page 292 – 9.1, 9.2, 9.5, 9.6.

Page 945 – 27.13.