TDBD15 – Advanced Data Models and Systems

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1 Course Staff

Instructor	Michael Minock
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Office	D424 MIT-huset
Office Hours	Tuesday,Thursday, and Friday 15:00 – 17:00 (or when my door is open and I have time)

2 Course Language

All lectures will be given in English, and all written work must be submitted in English. For the final examination, it will be permitted to use an XX-English / English-XX dictionary, where XX is the language of the student's choice.

3 Course Readings

The text for the class is the text used in the regular database course[3]. Additional readings will be made available through the website.

4 Online Resources

`http://www.cs.umu.se/kurser/TDBD15`

5 Course Topics

The readings are listed next to the following outline of course content.

1. Introduction ([1])
2. Semantic Modeling
   - 2.1 EER and Semantic Modeling (chapter 4(excluding 4.6) and 9.2[3])
3. Special Requirements
   - 3.1 Temporal Database Concepts (Section 23.2[3])
   - 3.2 Spatial Database Concepts (Section 23.3[3])
4. Object-Relational Approaches
   - 4.1 PostgreSQL ([5])
   - 4.2 SQL1999 and Object-Relational Systems (chapter 8 and 13[3])
   - 4.3 *EER/PostgreSQL Assignment Workshop*
5. Object-Oriented Databases (OODB)
   - 5.1 Concepts of Object-Orientation (chapter 11[3])
   - 5.2 ODMG 2.0 (chapter 12[3])
6. Deductive Databases
   - 6.1 Deductive Database Theory (Chapter 25[3])
   - 6.2 LDL++ ([7])
   - 6.3 *DeductiveDB/LDL++ Assignment Workshop*
7. Description Logics
   - 7.1 Description Logics ([2])
   - 7.2 CLASSIC ([6])
   - 7.3 *DL/CLASSIC Assignment Workshop*
8. Selected Topics (time permitting)
   - 8.1 Data Mining
   - 8.2 Cooperative Information Systems ([4])
   - 8.3 Representing Uncertainty
9. Conclusions and Exam Review

6 Course Schedule

Week	Date	Time	Room
12	Tue 20-Mar	10.15 - 12	MC413
12	Wed 21-Mar	10.15 - 12	MC313
12	Fri 23-Mar	10.15 - 12	MC313
13	Tue 27-Mar	10.15 - 12	MC413
13	Wed 28-Mar	10.15 - 12	MC146
13	Fri 30-Mar	10.15 - 12	MC313
14	Tue 3-Apr	10.15 - 12	MC313
14	Wed 4-Apr	10.15 - 12	MC313
14	Fri 6-Apr	10.15 - 12	MC313
15	Tue 10-Apr	10.15 - 12	MC313
17	Tue 24-Apr	10.15 - 12	MC313
17	Wed 25-Apr	10.15 - 12	MC313
17	Fri 27-Apr	10.15 - 12	MC313 (proposals due)
19	Tue 8-May	10.15 - 12	MC413
19	Wed 9-May	10.15 - 12	MC313
19	Fri 11-May	10.15 - 12	MC146
20	Tue 15-May	10.15 - 12	MC413
20	Wed 16-May	10.15 - 12	MC156
20	Fri 18-May	10.15 - 12	MC156
21	Tue 22-May	10.15 - 12	MC313
	30-May	16.00 - 22.00	Skrivsal 1 – Exam 1
	31-Aug	9.00 - 15.00	Skrivsal 2 – Exam 2

7 Grading System

40% (400 points) of the grade for the course will be based on a group project and 50% (500 points) will be based on an exam covering the reading materials and lectures. In addition, there will be 3 exercises with each accounting for 33 points covering 9.9%[1] of the grade.

In addition I will award bonus points for answering correctly difficult portions of the exercises or test. Bonus points may also be awarded to those who do an outstanding job on the project. Note that to actually be credited these points, the student must obtain at least 50% (250) points on their final exam.

[1] As an opening act of generosity, the final 1 point (0.1%) will be awarded for simply enrolling in this class.

In this class all homework is optional. Hence if you are **late** with it, you will lose points. Once the points for the homework have been exhausted, there is no way for you to receive points on the homework (unless you repeat the course). This is also the case with the final project.

Total points (p)	Grade
$p \geq 800$	5
$800 > p \geq 650$	4
$650 > p \geq 500$	3
$p < 500$	U

If you do not amass 500 points after this second exam, then you must repeat the course to receive a passing grade.

8 Exercises

There will be three required system exercises assigned during the course. Students may work in groups of up to four persons on these exercises. Based on my perception of exercise difficulty, I will assign a due date. Each exercise shall be worth 33 points, but exercises will lose 10 points per day late.

In addition the slides will propose optional 'paper' exercises along the way. Variants of these optional exercises may (more likely *will*) show up on the final exam.

9 Project

Working in groups of up to four persons, students must propose, in writing (max 350 words) and in person, a project of joint interest by the 13th lecture of class (preferably earlier). And this proposal *must* in turn be accepted. Candidate projects will occasionally be announced and described in class, but I would prefer for students to engage their creativity and propose programming (or theoretical) projects of their own interest. Note that students who do not have an accepted project by the end of the 13th lecture, will lose 50 points and will have a project assigned by me (to be received by the student(s) prior to the 14th lecture).

The students must complete the project by the end of the course. In a special (yet to be scheduled day-long demo session) they must present their work in a 20 minute talk. If the work is a system or application, they must also give an "industrial style" demo of their working system. In all cases the students must write a report, including a carefully crafted 1-page executive summary. Note that

all group members must be present at the demonstration and should be able to enthusiastically describe and support their group's system or application. Projects lose 50 points per day late.

The grades for the group projects will be assigned to all members equally. The grade will be based on the quality of the proposal, system demonstration, presentation material (and delivery), and the final written report.

References

[1] P. Bernstein, M. Brodie, S. Ceri, D. DeWitt, M. Franklin, H. Garcia-Molina, J. Gray, J. Held, J. Hellerstein, H. Jagadish, M. Lesk, D. Maier, J. Naughton, H. Pirahesh, M. Stonebraker, and J. Ullman. The asilomar report on database research, 1998.

[2] F. Donini, M. Lenzerini, D. Nardi, and A. Schaerf. Reasoning in description logics. In G. Brewka, editor, *Studies in Logic, Language and Information*, pages 193–238, 1996.

[3] R. Elmasri and S. Navathe. *Fundamentals of Database Systems 3rd edition*. Addison Wesley, 2000.

[4] T. Gaasterland, P. Godfrey, and J. Minker. An overview of cooperative answering. *Intelligent Information Systems*, 1(2):127–157, 1992.

[5] Bruce Momjian. *PostgreSQL: Introduction and Concepts*. Addison Wesley, 2001.

[6] L. Resnick, D. McGuinness, E. Weixelbaum, M. Abrahams, and A. Borgida. Neoclassic user's guide: Version 1.0., 1997.

[7] Carlo Zaniolo. *LDL++ Tutorial (For version 5.1)*. UCLA Computer Scienec Department, 1998.