

Advanced Database Management

MISM Course F11-95704 A

Fall 2011

Carnegie Mellon University

Instructor: Randy Trzeciak

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Building / Room: Hamburg Hall (HBH) 1000

Time: 5:30 - 8:20, Tuesday

Web site: <http://www.cmu.edu/blackboard/>

Textbooks

- Joline Morrison; Mike Morrison; Rocky Conrad. *Guide to Oracle 10g*. Course Technology, Cambridge, MA. 2006. ISBN: 0-619-21629-8 (MM)
- Thomas Connolly, Carolyn Begg. *Database Systems: A Practical Approach to Design, Implementation and Management. 5th Edition*. Addison-Wesley, Harlow, England. 2010. ISBN: 0-321-52306-7 (CB)

Prerequisite and Requirements:

Prerequisite: Database Management, 95-703

Requirement: Students *MUST* have a laptop with Oracle Database Express 10G, Oracle Client 10G, and Oracle Data Modeler installed on it.

Course Description

This course will have a technology component and an advanced topics component. Within the technology component, the student will learn and use several products: *Oracle Data Modeler* for database modeling, *PL/SQL* for creating program units that use SQL, and *Oracle Enterprise Manager and/or Tool for Oracle Application Developers (TOAD)* for managing and Oracle RDBMS and program units.

Within the advanced topics component, we will use some of our class sessions to review and discuss readings in topics like distributed databases, object-oriented databases, data mining and warehousing, OLTP, and database uses for the web.

Modules

Our semester will be organized into four modules. The first three will focus on skills. In these modules, the student will learn to use a CASE (Oracle Data Modeler) tool to design and generate a database schema, a procedural programming language that incorporates SQL statements, and a Graphical User Environment (Oracle Enterprise Manager and/or TOAD) for managing the RDBMS and program units. For these modules, we'll spend some of our time working on our laptops in class with the tools. In the fourth module, we will learn about and discuss a series of advanced topics that will include distributed databases, grid technology, object-oriented database issues, data warehousing, data mining, and database web connectivity.

Module 1 – Program Development with *SQL* and *PL/SQL*

PL/SQL is Oracle's SQL-based procedural programming language. In this module, we will write program blocks and learn how to create and use procedures, functions, and packages. The emphasis will be on good program design and the introduction of new concepts like triggers and cursors. A discussion and demonstration of SQL and PL/SQL development environments will be compared against the command-line interface of the sql*plus application (TOAD, SQL Developer, etc...).

Module 2 – Database Design and Development

In this module, we will learn how to use a CASE tool, *Oracle Data Modeler*, to develop a database model and generate the SQL code to build tables. We will review the principles of good database design and the building blocks of SQL and we'll learn about the use of CASE tools for database development.

Module 3 – Database Management

In this module, we will use *Oracle Enterprise Manager and/or TOAD*, to manage and Oracle RDBMS. In addition to creating an Oracle Instance, we will explore the following topics: Oracle Physical Architecture, Storage Concepts and Settings, Data Management, Table Management, Constraints, Indexes, Security Management, Performance Monitoring, Database Maintenance, and Backup and Recovery.

Module 4 – Advanced Database Management Topics

In this module, we will look at current and emerging issues involving database management systems. There will be assigned readings for each topic in this module that will serve as a starting point for our lecture and discussion of that topic.

Schedule (tentative...subject to change during semester)

Date	Module	Lecture/Lab	Readings/References
August 30		Course Introduction Relational Model	CB: Ch. 3 MM: Ch. 1 pgs. 2 - 16
September 6	1	SQL <i>SQL Lab 1</i>	CB: Ch. 6 & 7 MM: Ch. 2 & 3
September 13	1	Advanced SQL <i>SQL Lab 2</i>	CB: Ch. 6 & 7 MM: Ch. 2 & 3 Handouts
September 20	1	Introduction to PL/SQL Cursors and Subprograms <i>PL/SQL Lab 3</i>	CB: Ch.8 pgs. 213 - 223 MM: Ch. 4
September 27	1	Advanced PL/SQL Stored Procedures, Functions, Packages, and Exceptions <i>PL/SQL Lab 4</i>	CB: Ch.8 pgs. 213 - 223 MM: Ch. 4
October 4	2	Database Triggers Database Jobs GUI Tools for PL/SQL Maintenance <i>Triggers Lab 5</i>	CB: Ch. 8 pgs. 223 - 230 Handouts
October 11	2	Database Design Advanced Database Design Normalization	CB: Ch. 12 CB: Ch. 13 CB: Ch. 16 & 17
October 18	2	Normalization / De-normalization Oracle DataModeler <i>Oracle DataModeler Lab 6</i>	CB: Ch. 14 & 15 Handouts
October 25		Mid-Term Examination	
November 1	3	Database Administration <i>DBA Lab 7</i>	Handouts C&B: Ch. 20 pgs. 544 - 547
November 8	3	Database Administration	Handouts C&B: Ch. 20 pgs. 544 - 547
November 15	4	Data Warehousing, OLAP, Data Mining	CB: Ch. 32 & 33 CB: Ch. 34 CB: Ch 35
November 22	4	Web DB Connectivity Distributed Databases Grid Computing	CB: Ch. 3 CB: Ch. 24 & 25
November 29		In-Class Project Work	
December 6		Final Exam	
December 13		Project Presentations	

* Remember to bring your laptop to class on lab days.

Assignments

There will be seven assignments based on your work with the tools in the lab sessions. In general, these will be due every week or every other week. There will also be a project assignment for which you'll work in groups to design a database, implement it, and build forms and reports that can be used to interact with the database.

Following is a list of due dates for each assignment.

Assignment	Module	Due Date
1	1 – SQL	September 13 @ 5:30 pm
2	1 – Advanced SQL	September 20 @ 5:30 pm
3	1 – PL/SQL	September 27 @ 5:30 pm
4	1 – PL/SQL	October 4 @ 5:30 pm
5	2 – Database Design	October 18 @ 5:30 pm
6	2 – Oracle DataModeler	November 1 @ 5:30 pm
7	3 – Database Administration	November 8 @ 5:30 pm
Project Assignment	Synthesis of modules 1, 2 & 3	December 13 @ 5:30 pm

Grading

Assignments	20%
Project Assignment	30%
Mid Term Exam	25%
Final exam	<u>25%</u>
Total	100%

Please note that class attendance is important. Although I don't include attendance as part of the total percentage making up your grade, failure to attend class on a regular basis will have an adverse affect on your grade.

Students will only have 2 weeks after an assignment or exam is returned to question or challenge a grade. After the two week challenge period, the grade will not be changed. Please contact the instructor if you wish to question a grade.

Grade Distribution

I plan on using the Heinz School guidelines in deciding on the overall grade distribution. Accordingly, the average grade will be an A-. However, I grade on an absolute scale. If every student does well in the class, each will get an A+ regardless of the recommended grading scale. The same holds true on the other end of the scale.

Mid-Term Exam

The mid-term exam will cover material from the first half of the semester. The mid-term exam is scheduled for October 25 (5:30 pm – 8:20 pm). Please do not schedule anything that might conflict with the mid-term exam. *No one will be excused from it and there will be no make-up exam dates.*

Final Exam

The final exam will cover material from the entire semester. The Final exam is scheduled for December 6 (5:30 pm

– 8:20 pm). Please do not schedule anything that might conflict with the final exam. *No one will be excused from it and there will be no make-up exam dates.*

Late assignment policy

Homework is due at 5:30 pm on the assigned due date. I WILL NOT accept late homework unless the student has made arrangements with me prior to the assignment's due date. *PRIOR ARRANGEMENTS MUST BE MADE NO LATER THAN 12 PM ON THE DUE DATE.*

Policy on cheating and plagiarism

For Assignments 1 through 7, each student is responsible for handing in his/her own work. For the project assignment, each project team will work on and turn in work that has been created and developed by only those members of the team. For any assignment found to be the partial or complete result of cheating or plagiarism, your grade for that assignment will be zero. Cheating is defined as inappropriate collaboration among students on an assignment. This can include copying someone else's work with or without alteration. When students are found to be collaborating in this way, *BOTH* will pay the penalty regardless of who originated the work.

Classroom Etiquette

This is a Master's level course taught as part of a professional degree program. Accordingly, you are expected to conduct yourself in a professional manner during the course and not engage in behavior in the class that would be considered unacceptable in the workplace.

I expect the following guidelines to be followed:

- Do not sleep in class
 - I realize you may occasionally have had a rough day, are unwell, or otherwise are too tired to stay awake. In those cases, it is acceptable to excuse yourself from that class.
 - If you are always too tired to stay awake during lectures, you should consider finding an alternative course offering.
 - If you find the material boring, please let me know. I will attempt to modify the content to better suit your interests and needs.
- Turn off your cell phones. You are not to answer calls while in class. If you have a need to be available during class, please let me know before the lecture begins.
- Please don't browse the web, instant message, or check email during lectures. If you use your laptop for taking notes, please inform me prior to class.
- If you have a question about the content of the lecture, please direct it to me. If you are confused about an issue, chances are your classmates are confused as well. Please do not ask for clarification from your classmate during lecture.