ICS 212

Course Outline

Fall, 2020

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Purpose

ICS 212 provides the student with the foundational skills and knowledge needed to become a competent Database user. Students will be introduced to Oracle DBMA, MongoDB, learn industry standard practices for installing and configuring databases, and manage running databases using best-of-breed tools. By the end of the course, the student will be prepared to undertake database-centric software development projects.

Outcomes

By the end of this course students will be able to:

1. Discuss key concerns around the selection, installation and maintenance of databases with key stakeholders in a business setting.

2. Install, configure, and manage a commercial database management system in a production environment .

3. Backup and restore a customer's database.

4. Troubleshoot common issues that occur within a customer's database.

5. Install, configure, and manage a commercial database warehouse in a production environment.

6. Install, configure, and manage a NoSQL database in a production environment.

Prerequisites

The following prerequisites are required for ICS 200

1. Second year standing in the ICS program.

2. ICS 104 or ICS 199.

Recommended Course Texts

- **Beginning Oracle Database 12c Administration: From Novice to Professional**, 2nd ed. Edition by Ignatius Fernandez. ISBN: 978-1484201947. Available from Amazon for rent for $15.59

- **The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling**, 3rd Edition by Ralph Kimball and Margy Ross. ISBN: 978-1118530801. Available from Amazon for $46.39

- **The Data Warehouse Lifecycle Toolkit, Second Edition** by Ralph Kimball and Margy Ross. ISBN: 978-0470149775. Available from Amazon for $44.09

Recommended Hardware

This course assigns labs on a weekly basis that will enable students to gain practical experience using the Oracle DBMS and the MongoDB NoSQL database. As a result, it is recommended that students have access to computers capable of running these systems. The recommended computer is a **Windows 10 desktop** or **laptop** with **8GB** of RAM and **10GB** of free disk space. As an alternative, students may also access lab computers remotely that have these systems preinstalled.

Course Format

The course will meet once a week over a 13-week semester. Each week will consist of a 2-hour lecture and one three-hour lab. Additional time over and above the allotted lab time may be required to complete lab assignments.

Lectures will be delivered synchronously, on-line over D2L using D2L collaborate at a regularly scheduled time TBD. Supplemental material including study aids will be made available on a weekly basis within D2L.

Labs will be assigned and completed each week with the exception of the week of the midterm (week 7). The instructor will be available via collaborate during the regularly scheduled lab time.

Course Activities

The course lectures will provide the students with foundational database administrative theory. The weekly two-hour lab will provide the student with opportunities to put these concepts into practice within a real-world environment based on the Oracle XE and MongoDB. Lab assignments will include programming assignments, database management, troubleshooting and architecture activities. A midterm and final exam will be scheduled as will bi-weekly quizzes.

Schedule of Sessions

The following is a tentative schedule of learning. Changes to the schedule and content will be announced during regular class time and will be reflected in D2L. Lecture topics listed here will be covered in class using material from the course texts and other outside resources. Slides, supplementary notes and other course resources will be published in the content area in D2L.

Week	Lecture Topic	Lab Assignment
1	Course Overview Introduction to DBMS Introduction to SQL and PL/SQL Introduction to triggers	No lab this week

2	Oracle Architecture Planning Physical Design	Trigger, Functions, Procedure
3	Physical Design (continued) User Management Data Loading	Planning and Oracle XE Install
4	Taking Control Monitoring Fixing Problems	Physical Design
5	Backups Recovery Big Picture & SOPS	User Management
6	Introduction to Data Warehouse Lifecycle Dimensional Modeling	Data Import/Export & DBA
7	Review Midterm Exam	No labs
8	Dimensional Modeling Creating Dimensional Model Case Study	Flashback, SOP & Explain
9	Extract, Transform and Load Overview Transformation PL/SQL Review	Star Schema
10	SQL Functions Oracle Summaries Data Mining	Extract, Transform and Load
11	NoSQL Intro MongoDB Introduction MongoDB Basic Commands	Analytics
12	MongoDB Basic Commands MongoDB Arrays MongoDB Indexes Projection	MongoDB Install + Database Creation
13	MongoDB Aggregation MongoDB Schema Design Guidelines	MongoDB Database Manipulation

	MongoDB Security MongoDB Utilities		
14	Review		

Student Evaluation

Lab Assignments: 30%

Quizzes: 10% (5 quizzes, every other week, online. 2 chances per quiz)

Midterm exam: 10%

Final Exam: 50% (Dec 14–Dec 22, 2020, TBA). Must obtain 55% to pass.

Grades

The following table will be used to assign grades in this course.

Percentage	Grade	Description	Grade Point Equivalency
90-100	A+		9
85-89	A		8
80-84	A-		7
77-79	B+		6
73-76	B		5
70-72	B-		4
65-69	C+		3
60-64	C		2
50-59	D	Minimum level of achievement for which credit is granted; a course with a "D" grade cannot be used as a prerequisite. **A grade of at least 55% must be achieved on final to pass this course.**	1

0-49	F	Minimum level has not been achieved.	0

Policies

Lab Work

The only way to learn database management is by dedicated and sustained practice. For this reason, lab attendance is mandatory throughout the entire semester. Each lab will build on a previous week's completed results and for this reason, it is important that all labs be completed on time. Late assignments will be penalized at the rate of **10% per day and will not be accepted after 5 business days past due**. All labs are to be handed in to their associated assignment area within D2L in ZIP file format. Lab work is expected to be completed using proper software engineering practices and will be graded accordingly. Marking policies will be clearly stated in each week's lab assignment's grading rubric.

Exams

Without exception, all exams must be written at their scheduled time. Having said that, it is acknowledged that emergency situations arise from time to time. When they do, the instructor reserves the right to either issue a makeup exam or adjust the weighting of the course mark accordingly. If an emergency does arise, students must notify the instructor **prior to the exam** and provide documented evidence of the emergency in writing.