

ICS 212  
Course Outline  
Fall, 2023

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## *Purpose*

ICS 212 provides the student with the foundational skills needed to become a competent Database user. Students will be introduced to the Oracle DBMS, the MongoDB DBMS, 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 212

1. Second year standing in the ICS program.
2. ICS 104 or ICS 199.

## *Strongly Recommended Course Texts*

- **Beginning Oracle Database 12c Administration: From Novice to Professional**, 2nd ed. Edition by Ignatius Fernandez. ISBN: 978-1484201947. Available on Amazon Kindle for for \$65.05

- **The Data Warehouse Toolkit: The Definitive Guide to Dimensional Modeling**, 3rd Edition by Ralph Kimball and Margy Ross. ISBN: 978-1118530801. Available on Amazon Kindle for \$57.99
- **(optional) The Data Warehouse Lifecycle Toolkit, Second Edition** by Ralph Kimball and Margy Ross. ISBN: 978-0470149775. Available on Amazon Kindle for \$48.54

### *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 **12GB** 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 in-person at regular times. Recordings of lectures will be made available. Supplemental material including study aids will be made available on a weekly basis within D2L.

Labs will be assigned and completed each week except for the week of the midterm (week 8). The instructor will be available during the regularly scheduled lab time either in person or on Zoom.

### *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	No labs
2	Introduction to SQL and PL/SQL Introduction to triggers	Introduction to Oracle
3	Oracle Architecture Planning Physical Design	Trigger, Functions, Procedure
4	Physical Design (continued) User Management Data Loading	Planning and Data Import and Export
5	Taking Control Monitoring Fixing Problems	User Management
6	Backups Recovery Big Picture & SOPS	ImpExpDP, DBA and Data Dictionary
7	Midterm Exam	No labs
8	Introduction to Data Warehouse Lifecycle Dimensional Modeling	RMAN, SOP and Explain
9	Dimensional Modeling Creating Dimensional Model Case Study	Star Schema
10	Extract, Transform and Load Overview Transformation PL/SQL Review	Extract, Transform and Load (Part 1)
11	NoSQL Intro MongoDB Introduction MongoDB Basic Commands	Extract, Transform and Load (Part 2)
12	MongoDB CRUD and Query	MongoDB Install + Database Creation
13	MongoDB indexes and security	

### *Student Evaluation*

Lab Assignments: 30%. Must obtain 55% on each of 8 labs to pass.

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

Midterm exam: 10% (Week of October 23)

Final Exam: 50% (Dec 11–Dec 20, 2023, 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. <b>A grade of at least 55% must be achieved on final to pass this course.</b>	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 strongly recommended 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. 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.