**Required Texts & Learning Materials**
Casteel, J., Oracle 12c: SQL," 3rd edition, Cengage, 2015

**Suggested Books:**
1. Connolly, T. and C. Begg, "Database Systems: A Practical Approach to Design, Implementation, and Management," 6th edition, Pearson, 2014
2. Coronel, C. and S. Morris, "Database Systems: Design, Implementation, & Management," 12th edition, Cengage, 2016

Additional notes and readings will be posted via Blackboard > Course Document as needed.

**Software:**
We will use Oracle Database 12c Edition for Windows. No other components of Oracle Software will be used in the class.

**Course Description**
The emerging trend of organizations and business decision making is based on data-driven decision-making. In fact, database systems are central to most organizations' information systems strategies. At any organizational level, users are expected to face frequent contact with and use of database systems. Therefore, skills in using such systems, which include understanding the capabilities and limitations of the systems, identifying whether to access data directly or through technical specialists and knowing how to retrieve and utilize the information effectively became essential in any industry vertical. Also, skills in designing new systems and related applications are distinct advantage and necessity today. The Relational Database Management System (RDBMS) is one type of database systems, which is widely used and is the primary focus of this course.

Further, the course will provide students with an opportunity to apply the knowledge they learn from the lectures, homework assignments, SQL assignments, and a database implementation project.

**Course Overview**
Data are now recognized as a major organizational resource to be attained and managed like other assets such as land, labor and capital. The ability to structure, access, manage and leverage this valuable resource is becoming more and more critical to all organizations, large or small, public or private. Central to supporting this ability, and at the core of every information system, is the database. Developments in database technology have produced systems that are more powerful and easier to use, develop, and maintain.
This course will address the theory, application, and management of relational database technology. The benefits supported by database systems is particularly the case for relational databases. Also, it is the database structure that is predominantly used for business applications, and thus, we focus on RDBMS in this course. The course will cover topics including an overview of the relational data model, understanding entities and relationships, designing logical data models and database design using the process of normalization. We will also learn relational algebra as the theory behind data queries and implement actual data queries using SQL to manage and retrieve data from an Oracle database.

**Learning Objectives**
As a result of completing the activities of this course, students should be able to:
1. Understand relational data model in terms of data structure, data integrity, and data manipulation.
2. Understand and create conceptual database models utilizing entity-relationship.
3. Design data structures that will limit redundancy and enforce data integrity while conforming to organizational requirements utilizing normalization methodology.
4. Understand the theory behind the relational data model as it applies to interactions with current database management systems.
5. Interpret a given data model to query the database and transform the data into information using SQL (Structured Query Language).
6. Implement a data model in a current RDBMS.
7. Create reports based on transactional data, including elements such as data groupings and summary values.

**Attendance**
Attendance and class participation are part of each student's course grade. Students are expected to attend all scheduled class sessions. Each class will include opportunities for teams to work together. Failure to attend class will result in an inability to achieve the objectives of the course. Excessive absence will result in loss of points for team participation. Regular attendance and active participation are required for students to successfully complete the course. If you have an event that prevents you from attending the class, please notify the instructor 48 hours prior to the class, and discuss with your group members in advance to arrange the group discussion and presentation accordingly.

**Evaluation**
Students' grades will be based on a combination of evaluation exercises consisting of two assignments, a case analysis, final project, final exam, and the student's class participation. The breakdown of weights of each of the above is shown below.

| Assignment | Learning Objectives | Weight |
|---|---|---|
| Attendance and Participation | 1 - 7 | 10% |
| Homework assignments/Quizzes | 1 – 7 | 20% |
| SQL Assignments | 1 – 7 | 15% |
| Project | 1 – 7 | 10% |
| Final Exam | 1 – 7 | |
| Total | | 100% |

**Homework Assignments/Quizzes**: The homework assignments require students to employ holistic critical thinking to design database models applying the concepts learned in the lectures. The focus is on understanding business requirements and designing data models to capture quality data. The range of topics covered in the assignments include conceptual and logical database modeling, normalization, and relational algebra. The relational algebra assignment is a foundation for learning the SQL. Quizzes may replace homework assignments`

**SQL Assignment**: The SQL assignments are hands-on assignments that require students to create and execute various SQL statements and queries using Oracle Database 12c System. The submitted assignments are required to be well formatted and readable.

**Final project**: Based on the logical model of a small database, the project consists of implementing the data structure, performing specific queries, data manipulation tasks, and querying system catalog to retrieve metadata. The project will integrate and apply the concepts you have learned in class. Detailed guidelines for the project assignment will be distributed and discussed in a later part of the semester. The project deliverables are due at the beginning of the last class meeting (see the course outline below). SQL assignments maybe incorporated into the final project.

**Exam**: The exam will be comprehensive closed book, closed notes exam. The exam is to be completed by you individually without help of any other students. The date for the exam is specified in the class schedule.

**NOTICE ON ACADEMIC INTEGRITY**
The use of unauthorized material, communication with fellow students during an examination, attempting to benefit from the work of another student, and similar behavior that defeats the intent of an examination or other class work is unacceptable to the University. It is often difficult to distinguish between a culpable act and inadvertent behavior resulting from the nervous tensions accompanying examinations. Where a clear violation has occurred, however, the instructor may disqualify the student's work as unacceptable and assign a failing grade on the paper.

**Grading**
The grade of A is reserved for those who demonstrate extraordinarily excellent performance as determined by the instructor. The grade of A- is awarded only for excellent performance. The grades of B+, B, and B- are awarded for good performance. The grades of C+, C, and C- are awarded for adequate but substandard performance. The grades of D+, D, and D- are not awarded at the graduate level (undergraduate only). The grade of F indicates the student's failure to satisfactorily complete the course work.

Please note that for **Core** and **Foundation** courses, a maximum of 25% of students may be awarded an A or A-; the grade point average of the class should not exceed 3.3. For **Elective** courses, a maximum of 35% of students may be awarded an A or A-; the grade point average of the class should not exceed 3.4. (For classes with 15 students or fewer, the class GPA cap is waived.)

**Tentative Course Calendar**
Instructors reserve the right to alter course content and/or adjust the pace to accommodate class progress. Students are responsible for keeping up with all adjustments to the course calendar.

| Week | Content | Reading | |
|---|---|---|---|
| 1 | Introduction to Database | • Chapter 1 | |
| 2 | Concepts of DB | • Chapter 1 | |
| 3 | Database Environment | • Chapter 2 | |
| 4 | Relational Model<br>Entity Relationship Model | • Chapter 3 | Quiz #1 |
| 5 | Basic SQLTables | • Chapter 2 | |
| 6 | DB Creation<br>Quiz #2 | • Chapter 3 | |
| 7 | Data Modeling<br>Constraints & Data Manipulation | • Chapter 3 | Quiz |
| 8 | Database Design (Logical and Conceptual)<br>User Creation and Management | Chapter 4 | |
| 9 | Normalization<br>Database Objects | Chapter 4 | |
| 10 | Managing DB tables-Data Integrity | Chapter 5 | |

| Week | Content | Reading | |
|---|---|---|---|
| 11 | Single and Multiple table queries<br>• Project review #2 | Chapter 5 | |
| 12 | • Advanced Queries<br>• | • Chapter 6 | Project Due |
| 13 | • Introduction to Regular<br>  Expression Functions<br>• | • Chapter 6 | |
| 15 | • Final Exam | Comprehensive closed book | |