Carnegie Mellon
Heinz College

Course Information	95–703 A: Database Management 12 Unit Course Summer 2023 ***Instructor***: Janusz Szczypula Office: Hamburg Hall (HbH) 3036 Phone: 412 – 268 – 6096 E-mail: *js1m@andrew.cmu.edu* Office hours: *Posted on the class website (on the Contacts page)* ***Teaching Assistants (TAs):*** TBD ***Class Times***: Tuesday & Thursday, 9:30 a.m. – 10:50 p.m. HbH 1005 ***Class Schedule***: *Posted on the class website* ***Class Website***: *www.cmu.edu/canvas*
Prerequisites	There are no prerequisites for this course for students in MISM, and in MSIT Programs in the Heinz College. For other Heinz College students, 90728 (Introduction to Database Management) is a prerequisite.
Description	Database systems are central to most organizations' operations. At any organizational level, users can expect to have frequent interaction with databases, and to use then to prepare useful analytics. Therefore, understanding capabilities and limitations of databases, knowing how to access data, knowing how to effectively use the information stored in such database systems, and skills in designing database systems is a distinct advantage and necessity today. The Relational Database Management System (RDBMS) is the dominant type of database systems and is the primary focus of this course. This core course will cover topics such as: the relational data model (data structure, data integrity, and data manipulation), entity-relationship modelling, normalization, as well as the structured query language (for creating data structures and constraints, for managing tables' content, and for creating variety of queries that address business scenarios) Further, to provide students with opportunity to apply the knowledge learnt from lectures, various homework assignments, SQL assignments, and a database implementation project will be given.

Course Materials

Lecture Notes:

Lecture notes will be provided for each class. They can be used during the semester you take the class. They cannot be shared after the class is concluded without permission of the instructor.

Textbook:

Casteel, J., "Oracle 12c: SQL," Cengage Learning, 2016

Suggested Books:

Connolly, T. and C. Begg, "Database Systems: A Practical Approach to Design, Implementation, and Management," 6th edition, Addison-Wesley, 2015

Coronel, C. and S. Morris, "Database Systems: Design, Implementation, & Management," 13th edition, Cengage Learning, 2018

Hoffer, J. A., R. Venkataraman, and Heikki Topi, "Modern Database Management," 11th edition, Prentice Hall, 2012

Price, J., "Oracle Database 12c: SQL," McGraw Hill, 2014

Software:

We will use Oracle Database 21c Express Edition for Windows. No other components of Oracle Software will be required for this class. Have the software install on your laptop asap.

Course Objectives

Objective	How Assessed
Gain good understanding of relational data model in terms of data structure, data integrity, and data manipulation.	Homework Assignment, SQL Assignments Final Exam
Understand and create conceptual database models utilizing entity-relationship modeling.	Homework Assignment, Final Exam
Design data structures that will limit redundancy and enforce data integrity while conforming to business requirements utilizing normalization methodology.	Homework Assignment, Final Exam
Understand relational algebra as foundation for the Structured Query Language (SQL) used in Relational Database Management Systems.	Homework Assignment, Final Exam
Implement a data model in a current Relational Database Management System (creating a database, creating and enforcing data integrity rules, populating the database tables, and running various queries to test the implemented model).	Project
Read and interpret a given data model to query the database and transform the data into information using SQL language.	SQL Assignment, Project
Apply advanced query concepts (including elements such as sub-queries, aggregating data, and Analytic SQL) for analyzing enterprise data and creating complex reports.	SQL Assignment, Project

Evaluation Method

Student's performance in the class will be evaluated based on the following components:

Homework Assignments	20%
SQL Assignments	20%
Project	20%
Final Exam	40%
TOTAL :	100%

Homework Assignments:
The homework assignments require students to employ holistic critical thinking to design database models applying the concepts learnt in the lectures. The focus is on understanding business requirement and designing data models to capture good quality data. Topics covered in the assignments includes conceptual and logical database modeling, normalization, and relational algebra. The relational algebra assignment is a foundation for learning the Structured Query Language (SQL).

SQL Assignments:
The SQL assignments are hands-on assignments that require students to create and execute various SQL statements and queries, using Oracle Database 21c Express Software, that address business requirement. The submitted assignments are required to be well formatted and readable.

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. Guidelines for the project assignment will be distributed and discussed in a later part of the semester.

Exam:
The exam will be a comprehensive closed book, closed notes exam. The exam is to be completed by you individually *without* help of any other student. The date for the exam will be decide asap. The exam will be graded by the Instructor and class TAs. Final grades will be posted in the official Student Information System that can be accessed by students directly through the Internet.

Grading Scale

A+	97% – 100 %	B+	85% – 88.99 %	C+	73% – 76.99 %
A	93% – 96.99 %	B	81% – 84.99 %	C	69% – 72.99 %
A–	89% – 92.99 %	B–	77% – 80.99 %	C–	65% – 68.99 %

Scores below 65% equate to a failing grade (R)

Course Policies & Expectations	*Lectures*: While no attendance will be taken, it is in your interest to attend each lecture. Class participation is encouraged and expected. As research on learning shows, unexpected noises and movement automatically divert and capture people's attention. I encourage you to avoid any activity not related to class. Please turn off your phone notifications and limit other likely sources of technology disruption, so you can fully focus on the lectures. This will create a better learning environment for everyone. No student may record any classroom activity without the express written consent of the instructor. This is to protect your FERPA rights and those of your fellow students. *Missed Classes*: Students are responsible for obtaining class material, which may have been discussed on days when they are absent. This can be done through the class website, by contacting a classmate who was present, or by contacting the instructor. *Assignments*: All assignments are due at the beginning of class on the day specified (printed assignments only) before the lecture starts. No assignments submitted after the deadline will be accepted, unless permission is granted by the instructor prior to the due date. Late assignments, if approved, should be submitted directly to the instructor. Do not submit any late assignments to class Teaching Assistants. Each assignment must be typed, and diagrams created using PowerPoint or an equivalent tool. No collaboration in any form on assignments is allowed. It is important that the work you turn in is wholly your own. All assignments are graded by class TAs and reviewed by the instructor before they are returned to students within a week of submission. Solutions to each assignment will be provided when the graded assignments are returned. Uncollected assignments will be shredded. If you believe that your assignment was graded incorrectly, you may request that it be re-graded. To do this, turn in your graded assignment in question with an explanation (email to the instructor will be sufficient) within a week from the time the assignment was returned to you. The entire assignment is subject to re-grading, not just the specific item(s) in question and the grade may go up or down. *Accommodations for Students with Disabilities:* If you have a disability and have an accommodation letter from the Disability Resources office, I encourage you to discuss your accommodations and needs with me as early in the semester as possible. I will work with you to ensure that accommodations are provided as appropriate. If you suspect that you may have a disability and would benefit from accommodations but are not yet registered with the Office of Disability Resources, I encourage you to contact them at access@andrew.cmu.edu.

	Statement of Support for Students' Health & Well-being: Do your best to maintain a healthy lifestyle this semester by eating well, exercising, avoiding drugs and alcohol, getting enough sleep, and taking some time to relax. This will help you achieve your goals and cope with stress. If you or anyone you know experiences any academic stress, difficult life events, or feelings like anxiety or depression, we strongly encourage you to seek support. Counseling and Psychological Services (CaPS) is here to help: call 412 – 268 – 2922 and visit their website at http://www.cmu.edu/counseling/. Consider reaching out to a friend, faculty or family member you trust for help getting connected to the support that can help.

Academic Honesty and Integrity	All CMU students are expected to follow the ethical guidelines and adhere to the policies as defined in your Program's Student Handbook or in any other source describing such policies as they apply to students at Carnegie Mellon University. These policies and guidelines are available on the CMU web site. Please read them carefully! You will be held accountable for any violations of these policies and guidelines. Individual assignments must reflect individual effort. Although I expect you to attempt solving each problem on your own, I encourage you to seek help from the class TAs if you struggle with any assignment. Sharing any part of your assignments with any other student in any form (whether it is an email message, a paper document, an electronic document such like a MS Word document, or your work in any other format) is not permitted and will be considered cheating. Any "discussion" between students that results in a similar HW submission is also not allowed. If you are in possession of any other person's document or file from this or any other semester, you are in jeopardy. Any violations of academic integrity in this class will have the following consequences: (a) no credit for assignment in question and lowering final grade by one letter (e.g., from B to C), (b) in more serious offences, failing the class. **All incidents are reported to the Office of Community Standards & Integrity at Carnegie Mellon University. Additional penalties may be imposed.**