

Carnegie Mellon
Heinz College
 95-703: Database Management

Course Information	12-Unit Course Spring, 2024 Instructor: Jeremy Smith Email: smithj@andrew.cmu.edu / jcsmith@cmu.edu Office hours: Will be posted on Canvas Website Class Website: http://www.cmu.edu/canvas Teaching Assistants: <i>Teaching assistant office hours schedule and zoom links will be posted to Canvas Contacts page</i> • The Instructor and TAs in this course are here for a few purposes: ○ To guide you through the course and answer questions that you may have from the lecture material. ○ To assist with and answer questions about the homework assignments. ○ To answer general questions about the material, even if it is outside of the bounds of the lecture material. <i>Please be sure to make use of all of our availability to help you better understand the material.</i>
Overview	This course is appropriate for master's students who wish to acquire a technical understanding of relational database systems; their design, development, management and application. We will use the Oracle Relational Database Management System (RDBMS) to implement data structures and to query the information.
Description	Data are recognized as a major organizational resource to be managed like other assets such as land, labor and capital. The ability to structure, access, manage and leverage these important resources 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 is especially true for relational databases - the predominant database structure used for business applications - and the primary focus of this course. This semester-long core course will address the theory, application and management of relational database technology. 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 within an Oracle database. The homework assignments will provide students an opportunity to apply the knowledge they learn from the lectures and readings.

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Course Materials	For each lecture, the instructor will provide notes and any class material relevant for the lecture. Suggested Books*: ✧ Casteel, J., “Oracle 12c: SQL,” Cengage Learning ✧ 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,” 12th edition, Cengage Learning, 2017 ✧ Price, J., “Oracle Database 12c: SQL,” Mc Graw Hill, 2014 <i>*Note: There are no required textbooks for this course</i> Software: Students will use Oracle client tools to connect to databases hosted by Heinz College. Instructions will be posted to the Canvas website during the first half of the semester.								
Course Objectives	<table><tr><th>Objectives</th></tr><tr><td>Gain an understanding of relational data models in terms of data structure, data integrity, and data manipulation.</td></tr><tr><td>Understand and create conceptual database models utilizing entity-relationship modeling.</td></tr><tr><td>Design data structures that will limit redundancy and enforce data integrity while conforming to organizational requirements utilizing normalization methodology.</td></tr><tr><td>Understand the theory behind the relational data model as it applies to interactions with current database management systems</td></tr><tr><td>Read and interpret a given data model to query the database and transform the data into information using Structured Query Language (SQL).</td></tr><tr><td>Implement a data model in a current relational database management system.</td></tr><tr><td>Create SQL queries, based on transactional data, including elements such as data groupings and summary values.</td></tr></table> <i>*For specific topics covered in this course, please see the Course Schedule</i>	Objectives	Gain an understanding of relational data models in terms of data structure, data integrity, and data manipulation.	Understand and create conceptual database models utilizing entity-relationship modeling.	Design data structures that will limit redundancy and enforce data integrity while conforming to organizational requirements utilizing normalization methodology.	Understand the theory behind the relational data model as it applies to interactions with current database management systems	Read and interpret a given data model to query the database and transform the data into information using Structured Query Language (SQL).	Implement a data model in a current relational database management system.	Create SQL queries, based on transactional data, including elements such as data groupings and summary values.
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Evaluation Method	Students' performance in the class will be evaluated based on the following components: <table><tr><td>Assignments</td><td>70%</td></tr><tr><td>Final Exam</td><td>30%</td></tr></table>	Assignments	70%	Final Exam	30%														
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Grading Scale	<table><tr><td>A+</td><td>96.67% – 100 %</td><td>B+</td><td>86.67% – 89.99 %</td><td>C+</td><td>76.67% – 79.99 %</td></tr><tr><td>A</td><td>93.34% – 96.66 %</td><td>B</td><td>83.34% – 86.66 %</td><td>C</td><td>73.34% – 76.66 %</td></tr><tr><td>A–</td><td>90% – 93.33 %</td><td>B–</td><td>80% – 83.33 %</td><td>C–</td><td>70% – 73.33 %</td></tr></table> Scores below 70% equate to a failing grade (R). No curve is applied to grades.	A+	96.67% – 100 %	B+	86.67% – 89.99 %	C+	76.67% – 79.99 %	A	93.34% – 96.66 %	B	83.34% – 86.66 %	C	73.34% – 76.66 %	A–	90% – 93.33 %	B–	80% – 83.33 %	C–	70% – 73.33 %
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Class Meetings	This is an asynchronous-format course (as opposed to a self-paced learning course). This means that we have scheduled lecture topics for each week of the semester. We do this to ensure that everyone is learning the same material at the same time. Please keep in mind that class discussions will be focused on the material that is scheduled for the week and assignments will be made available and due at pre-determined times based on the schedule. A few items about the roles in this course: ○ The course schedule, assignments, grading and general course policies are specific to the course this semester and may be different than what you hear Professor Szczypula discuss in the lectures. ○ Please focus only on the material in the lectures and refer to the syllabus and schedule found on the Canvas website for this semester's course to determine which lecture is the week's focus and what assignments are coming due.																		

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Assignments	Due dates for assignments are posted on the course schedule in <i>Pittsburgh/Eastern Time (ET)</i>. All assignments <u>must</u> be submitted by the due date/time noted on the assignment posting. Assignments submitted after that deadline, <i>if accepted</i>, may be penalized unless permission was granted by the instructor <u>prior</u> to the due date. Each assignment must be submitted as an electronic file in PDF format. Diagrams can be created using PowerPoint, https://app.diagrams.net/ or an equivalent tool (do not submit scanned images of handwritten models). Assignment Extension Requests <i>Assignment Extension Requests *MAY* be approved in certain cases ONLY for extenuating circumstances such as illness or family emergencies.</i> <i>Do not request an extension due to work or travel schedules.</i> <i>Prior approval for extensions MUST be requested by the student contacting the instructor as early as possible. Do not request approval from teaching assistants.</i> All assignments are graded by class TAs and reviewed by the instructor before they are returned to students within a week of submission. Suggested solutions will be provided when the graded assignments are returned.
Canvas Discussion Boards and Announcements	The “Discussion Board” and “Announcement” features of Canvas will be used throughout the semester. <i>It is expected that you monitor the Canvas course website regularly</i> and “subscribe” to discussion boards as they are created each week during the semester. By subscribing, you will be notified via email when items are posted there. Items can include class discussion, homework clarifications, etc. While there is no formal assessment of participation in class, regular participation is encouraged and expected. In this asynchronous-format class, most participation is through discussion groups on Canvas. I will occasionally post questions or comments to start a conversation. Please post questions and conversation starters yourself, as well. These discussions allow students an opportunity to learn from each other and share their own thoughts and experiences. I will create a discussion group topic for each week’s lecture and one for each homework assignment as well as a few that will remain throughout the semester for general course questions and Oracle technical questions. Please post any questions, thoughts, insights, experiences, etc. that you have related to the material to share with the class. The TAs and I will monitor the discussion groups regularly to respond to posts. The discussion groups are a great way to learn from one another.

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Accommodations for Students with Disabilities	If you have a disability and are registered with the Office of Disability Resources, we encourage you to use their online system to notify me of your accommodations and discuss your needs with me as early in the semester as possible. We 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, we 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.

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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 guidelines and policies. 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 your assignments with any other student in any form (whether it is a paper document, an electronic document such like a MS Word document, or a document 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) at the minimum, no credit for assignment in question <u>and</u> lowering final grade by one letter (e.g., from B to C); (b) in more serious offenses, failing the class; All violations of academic integrity are reported to the Associate Dean’s Office. Additional penalties may be imposed.
Use of Generative Artificial Intelligence (AI)	To best support your own learning, you should complete all graded assignments in this course yourself, <i>without any use of generative artificial intelligence (AI) tools</i>. Please refrain from using AI tools to generate any content (text, video, audio, images, code, etc.) for an assignment or classroom exercise. Passing off any AI generated content as your own (e.g., cutting and pasting content into written assignments, or paraphrasing AI content) constitutes a violation of CMU’s academic integrity policy. If you have any questions about using generative AI in this course, please email or talk to me.