Meharry Medical College

School of Applied Computational Sciences

Graduate Program: Data Science

MSDS 700: Database Management Systems

1. Contact information

Course prerequisites: None.
Credit Hours: 3 credit hours, Fall.

Dr. M. Zakaria KURDI

Zakaria.kurdi@mmc.edu

2. Course Meeting Times & Office hours

Tuesday, 5:30-8:30 pm, online

You're welcome to reach out to schedule a one-on-one meeting at a time that works best for you. I'll do my best to accommodate your availability. I will also invite students for one-on-one review sessions as needed to ensure everyone stays on track.

3. Course Objectives

This Introduction to Database Management Systems focuses on both practical and theoretical issues related to storing, changing, and retrieving data. Topics include SQL, Database design, and database normalization.

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

- Understand and use a DBMS.
- Be able to create a database, change its structure, insert data into it, change the data and retrieve the data using SQL.
- Master Database Indexing and Optimization.
- Ensure Database Security and Integrity.
- Explore Alternative Database Approaches.
- Be able to design a database and normalize its tables.

3.1 ABET Learning Outcomes

As per requirements for ABET accreditation, students will be given lessons and assignments that will facilitate experiential learning and growth in the following outcomes:

1. Complex problem analysis and data science solution.
   a. Analyze a data science solution.
   b. Identify and define data science requirements to solve a problem.
   c. Select, apply, and evaluate tools and methods to address a data science problem.

2. Design, implement, and analyze data science solutions.
   a. Design a data science solution
   b. Implement a data science solution
   c. Evaluate a data science solution
3. Communication.
   a. Demonstrate oral and visual presentation skills of information, concepts, and ideas
   b. Demonstrate technical writing skills in lab reports and projects
   c. Demonstrate ability to pay attention during discussions and to provide meaningful feedback
4. Professional responsibilities based on legal and ethical principles.
   a. Propose and justify a course of action that aligns with both legal requirements and ethical principles related to a data science problem
   b. Identify potential ethical concerns, and their impacts on stakeholders, within a data science assignment or project
   c. Apply appropriate ethical frameworks and articulate how they relate to a data science solution
5. Function effectively on teams
   a. Attend team meetings
   b. Make a serious effort at assigned work before team meetings
   c. Notify a teammate if not able to attend a meeting or fulfill a responsibility
   d. Make contributions in team meetings
   e. Listen to teammates' ideas and opinions respectfully and give them careful consideration
   f. Cooperate with the group effort
6. Application of knowledge to discipline
   a. Demonstrate the ability to extract quantitative information presented in various forms (e.g., equations, graphs, diagrams, tables, and/or words)
   b. Demonstrate understanding of Big (Real-World data/data science) programming paradigms
   c. Demonstrate ability to draw conclusions based on quantitative analysis, which may involve calculation
   d. Demonstrate ability to critically evaluate the quantitative process(es) used, results obtained, and conclusions drawn

Information and content will be delivered through a mix of lecture presentations, reading assignments, videos, podcasts, webinars, case presentations, and discussions with the instructor, guest speakers, and/or other students. The course will be blended in the sense that the instructor will make extensive use of Blackboard/Github and from time-to-time may post recorded lectures.

4. Teaching methods & Textbook

The instruction will be a mixture of lectures, hands-on activities, assignments, and group projects.

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Thomas Connolly, Carolyn Begg, *Database Systems: A Practical Approach to Design, Implementation, and Management* 6th Edition, Addison Wesley, ISBN: 0132943263.

- Other books that can be useful (not required)

Ramez Elmasri, Shamkant Navathe, Fundamentals of Database Systems, Addison-Wesley Publishing Company, ISBN:978-0-13-608620-8, 09 April 2010.

Carlos Coronel, Steven Morris, *Database Systems: design, implementation, and Management,* 12e, Cengage Learning, 2017. ISBN: 978-1-305-62748-2.

- Older editions of the above books are also good.

5. Grading & policies

Students are expected to:

- Participate in the class discussions and activities. Participation is mainly by attending, asking questions, and answering questions. I will grade your answers during the meetings. I am expecting you to watch the video and to have some understanding of its content prior to the class time.
- Complete all assignments.
- Be involved in a project related to the course topics.

The following is the grading scale for the course:

Assignment weights:

Course components	%
Assignments	40
Participation	10
Project	30
Midterm exam	20

Grade scale:

Letter Grade	Number Grade
A	>= 90

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B+	90 > x >= 85
B	85 > x >= 80
C+	80 > x >= 75
C	75 > x >= 70
F	70 > x

There is no pre-established quota of As, B+s, Bs, C+s, Cs, etc. for this class. Completion of the course requirements and the accumulation of at least 70% credit will constitute successful completion of the course and a passing grade. Grade Point Averages (GPA) are calculated on the basis of A=4, B+=3.5, B=3, C+=2.5 C=2, F= O. All final grades shall remain on the student's permanent transcript.

The grade of "I" (Incomplete) indicates that the student has satisfactorily completed at least three fourths of a course and may be given at the instructor's discretion to a student when illness, necessary absence, or other reasons beyond the control of the student prevent completion of course requirements by the end of the academic term. A student cannot receive an "I" if he/she is failing a course. A student receiving an "I" must complete the requirements for the course to remove the "I" by the end of the next semester the course is offered. If the requirements are not completed within the specified time, no credit will be given and the Office of Admissions and Records will automatically record the final grade as "F".

The symbols "WV" and "WA" indicate that the student "Withdrew Voluntarily" or was "Withdrawn Administratively by the Dean." The symbols "WP" and "WF" indicate that the student "Withdrew Passing" or "Withdrew Failing," respectively. These symbols are used only when the student has withdrawn after at least six weeks of attendance in a course during the fall or spring semester or after two weeks during the summer. Whether 'WP' or 'WF', if the student returns to a particular course, he or she must take it over in its' entirety.

The "IP" (In Progress) is awarded for certain courses that are continuous over more than one semester and, as such, are not finally evaluated until the conclusion of the sequence. Final grades are given in such courses only at the end of the final semester of the course sequence. A record of academic progression, however, shall be reported in the Office of Admission and Records at the end of any given semester using the designation In-Progress (IP). Quality points will be calculated using the total hours of the course.

Students from other graduate programs will receive a letter grade for the course per the requirement of their individual programs. All students will be expected to attend all class sessions, complete all assigned readings and participate in all group assignments.

Participation grade is divided into two parts. The first part, out of 5pt, is about regular presence in the class. A student with more than three absences will get zero in the participation part unless he/she provides a valid justification. The second part of the participation is about interacting with the teacher and other students during class time. Examples of interactions are asking questions, answering questions, and regular posts to the online course Discussion Board.

6. Acknowledgment of Class Recordings

Our class sessions may be audio-visually recorded for students in the class to refer back. Students who participate with their camera engaged or sit in the physical classroom agree to have their video or image recorded. If you are unwilling to consent to have your video or image recorded, be sure to keep your camera off. Likewise, students who participate orally in class agree to have their voices recorded. If you are not willing to consent to have your voice recorded during class, you will either need to remain silent or keep your mute button activated and communicate exclusively using the "chat" feature, which allows students to type questions and comments live. By participating in this class either physically or virtually, each student acknowledges, consents and agrees that any recordings of this class may be disclosed to, shared with and viewed by other MMC students, faculty or staff for educational purposes.

7. Course Topics

Here is an indicative list of topics that will be covered during the course. Some modifications could be made to the topics and timing according to the students' needs.

1. Introduction to DB
2. Introduction to SQL
3. Retrieval of data from a DB (one or more tables)
4. Table creation
5. Insertion of data into a table
6. Table structure change
7. Data change
8. Entity Relationship Model (ERM)
9. Data normalization
10. Database Administration
11. Stored Procedures
12. Database security

8. Various Policies

8.1 Academic honesty

Students enrolled in this course are expected to conduct their affairs ethically with honesty and integrity. Individuals who do otherwise can expect their professional careers to be adversely impacted. Unless otherwise indicated, all assignments are to be completed individually, with help from no one other than the instructor when warranted. It goes without saying that group assignments require collaboration among students. You should check with your instructor if you have concerns about group work.

Unethical academic behavior (cheating) includes, but is not limited to, copying assignments or answers on exams, plagiarism, inappropriate or fraudulent citation of the work of others, "borrowing" other students' data/information and submitting/representing it as your own, unauthorized copying of computer files, and unauthorized use of electronic media to transmit information and communicate with other students at test time (email, instant messaging, use of chat rooms, etc.). At a minimum, students who cheat will receive "**no credit**" (a score of zero) on the assignment in question; but students may also be dismissed from the course and automatically assigned a grade of F. In addition, any suspected evidence of cheating will be referred to the Dean of the School of Graduate Studies. The article "Integrity: Academic and Political—A Letter to My Students," by Bill Taylor is an excellent discourse concerning academic integrity and each student is encouraged to read it (this post is found in the Syllabus-Related Documents section of the Blackboard course).

8.2 AI/LLM usage

LLM's are here to stay and must be embraced by data scientists in both professional and academic settings. They can be powerful educational and productivity tools. HOWEVER, excessive use of these tools (particularly in foundational courses like MSDS 510/520) can result in students failing to learn the material and remain unprepared for future work. Thus, moderate use of LLM's is not only allowed but encouraged given that students do not use them as a crutch.

Requirements for AI use in class assignments:

1. Explain what aspects of the assignment you used AI to complete.
2. Failure to report obvious AI usage on assignments may result in a penalized grade on those assignments.

8.3 Late submissions

Students should be punctual when turning in their assignments. If you have a conflict or emergency and realize that you will not be able to complete the assignment in time, reach out to the instructor as soon as possible so that arrangements can be made. Late submissions (which have not been approved by the instructor) will result in a loss of 10% on that assignment grade per late day.

8.4 Course drop policy

Any student who no longer attends class after course registration and drops the course either voluntarily or due to some reasons has to inform the instructor or advisor first and then fill the course withdrawal form

provided by instructor to drop the course. There must not be any course drop/withdrawal without following the above specified guidelines and informing the instructor. The form to be filled is in the link: Course-WithdrawalForm.

8.5 Attendance policy

The MSDS program is offered in a compressed format, so missing any class time is not appropriate. While we understand that life happens and will address issues of tardiness / absence on a case-by-case basis, the attendance policy mandates that once 25% of in-class meetings are missed that the course must be repeated. Keep in mind that (a) tardiness can impact your class participation score and (b) missing class time can result in having to drop the class and re-take it at a later time. There will be a roll call for attendance in each class which will be recorded.

8.6 Student with disabilities

Meharry Medical College recognizes and supports the standards set forth in Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act (ADA) of 1990. These laws are designed to eliminate discrimination against qualified individuals with disabilities. Disabilities may include physical or mental impairments that substantially 26 limit one or more of a person's major life activities, which necessitate modifications. Meharry Medical College is committed to making reasonable accommodations for qualifying students with disabilities as required by applicable laws. Accommodations are tailored to meet the needs of each student with a documented disability. Specific concerns pertaining to services for students with disabilities or any disability issue should be directed to the student disability services representative at disabilityservices@mmc.edu or (615) 327- 6500 or in person at the Anna Cherrie Epps Ph.D. Center for Educational Development and Support (CEDS). Meharry Medical College complies with the American Disabilities Act in allowing use of service animals for students, staff, and visitors. Meharry also complies with the Fair Housing Act in allowing students the use of approved emotional support animals as an accommodation. Please contact the College's ADA Department for more information.

8.7 Classroom Behavior

Your instructor is committed to developing and actively promoting a class environment in which

respect is shown to everyone in order to facilitate and encourage the expression, testing, understanding, and creation of a variety of ideas and opinions. Rude, sarcastic, obscene, or disrespectful messages/comments/remarks have a negative impact on everyone's learning and will not be tolerated. Students are expected to abide by the University's policies and principles of academic integrity.