DSBA/HCIP-6160 Database Systems for Data Scientists   Fall 2022

Instructor: Dr. Liyue Fan Email: liyue.fan@uncc.edu Mode: hybrid (with online async)	Website: https://uncc.instructure.com/courses/182851 TA: Katherine Meng (kmeng@uncc.edu) Office hours: see course website

Course Description

The modeling, programming, integration, and provenance of big data. Focuses on SQL, but may also address other advanced topics. Topics include: (1) modeling/theory: basics of Relational DBMS and database design; (2) programming: SQL query languages; (3) integration: data warehousing, preprocessing; (4) databases in the Cloud and NoSQL; (5) provenance, security, and privacy; (6) domain applications. 3 credits.

Pre-requisites

Full graduate standing or permission of department.

Course Objectives

- Demonstrate proficiency in SQL programming
- Know and apply general DBMS principles
- Describe and critique key considerations related to advanced topics in DBMS such as NoSQL, cloud, database applications, and data management
- Experience with data preparation and analytics using relational databases

Like any other skill, your understanding of these concepts will develop only through extensive reading, writing, and practice.

Topics

- Course Overview, Relational Model Overview, Relational Algebra
- Foundational SQL – SQL Queries
- Intermediate SQL - Advanced Queries, Data Manipulation, Built-in Functions
- Advanced DB topics - Conceptual Database Design, Normalization, Integrity Constraints, Views, Indexes, Authorization, Privacy, Provenance
- Online Analytical Processing (OLAP) and Data Warehouses
- NoSQL and Cloud Systems
- Database Applications – health analytics, mobile applications

Instruction Method

This course will use a combination of self-learning, assignments, and collaborative activities.

Course Material

Required Textbook:

"*Murach's MySQL*", 3rd Edition, By Joel Murach, ISBN: 9781943872367, Murach Books

Additional readings, tutorials, and instructional material will be available on Canvas.

Assessments and Grade Determination

Quizzes (15%)	Three quizzes will be given to assess the concepts studied in class.
Labs (15%)	Labs will give you the opportunity to explore one or more concepts in more depth.
Projects (45%)	Two projects will be assigned to apply class concepts in realistic applications.
Homework (20%)	Homework is assigned almost every week.
Group Work (5%)	Students will meet online weekly in smaller groups for discussion and collaboration.

All assignments are to be submitted individually, unless stated otherwise.

This course will employ a 10-point scale. Final letter grades are assigned as follows:

A = 90% or above
B = 80% or above
C = 70% or above
D = 60% or above
F = below 60%

Attendance and Late Policy

The course format is hybrid with in-person and online async components. Students are expected to participate at listed meeting times and virtually at their own paces.

Assignments are considered late if they are not completed by the stated due date and time. If an assignment is late, you will have two additional days to complete it for late credit (unless otherwise stated in the syllabus or assignment instructions.) The *late penalty* equals a 20% reduction to the grade you would have received. Work received after two days will receive no credit.

Students are welcome to discuss with the instructor regarding medical appointments, military/court orders, and/or personal and family emergencies, such as a death in the immediate family, where a student is able to provide an instructor with appropriate supporting documentation.

The Office of Student Assistance and Support Services (SASS) can provide notification to faculty of emergency situations (personal and family). Students can submit an online request form and attach supporting documentation. In cases of absence due to pregnancy or parenting (pregnancy, childbirth, false pregnancy, termination of pregnancy, or recovery from any of these conditions), students should contact the Title IX Office to obtain absence verification by completing the form at http://bit.ly/332eaGd.

Proactive Participation and Group Work

Collaboration and thoughtful discussions are most important in making the course productive and fun, especially in an online environment. Discussion boards will be used for asking questions and sharing knowledge. Student groups will be formed to facilitate close collaborations.

Students with a documented learning disability that would prevent them from participating should notify the instructor at the beginning of the semester.

Class Communication

All class communications will be sent via Canvas. Questions regarding course material and assignments should be posted on Discussions. Students are welcome to use emails for private matters.

Topics and Assignments

The latest reading and assignments are available on the course web site. The list will be updated as we proceed throughout the semester. Students are responsible for getting up-to-date information on the current readings and assignments.

Syllabus Subject to Change

This syllabus may be altered based on best practices that fit changing circumstances.

The standards and requirements set forth in this syllabus may be modified at any time by the course instructor. Notice of such changes will be by announcement by changes to this syllabus posted on the course website.

University Policies

Academic Integrity:

All students are required to read and abide by the Code of Student Academic Integrity. Violations of the Code of Student Academic Integrity, including plagiarism, will result in disciplinary action as provided in the Code. Definitions and examples of plagiarism are set forth in the Code. The Code is available from the Dean of Students Office or online.

Faculty may ask students to produce identification at examinations and may require students to demonstrate that graded assignments completed outside of class are their own work.

Course Credit Workload:

This 3-credit course requires 3 hours of classroom or direct faculty instruction and 6 hours of out-of-class student work each week for approximately 15 weeks. Out-of-class work may include but is not limited to: assigned reading and video viewing, written assignments, studying for quizzes, and project work.

Classroom Recording:

Electronic video, image capture, and/or audio recording is not permitted during class, whether conducted in person or online, unless the student obtains permission from the instructor. If permission is granted, any

distribution of the recording is prohibited. Students with specific electronic recording accommodations authorized by the Office of Disability Services do not require instructor permission; however, the instructor must be notified of any such accommodation prior to recording. Any distribution of such recordings is prohibited.

Code of Student Responsibility:

The UNC Charlotte Code of Student Responsibility (the Code) sets forth certain rights and responsibilities in matters of student discipline. The Code defines these responsibilities and guarantees you certain rights that ensure your protection from unjust imposition of disciplinary penalties. You should familiarize yourself with the provisions and procedures of the Code.   Please refer to the full Code for complete policies and procedures, available at legal.uncc.edu/policies/up-406 or the Dean of Students Office.

Disability Accommodations:

Students in this course seeking accommodations to disabilities must first consult with the Office of Disability Services and follow the instructions of that office for obtaining accommodations.

Title IX Reporting:

UNC Charlotte is committed to providing an environment free of all forms of discrimination and sexual harassment, including sexual assault, domestic violence, dating violence, and stalking. If you (or someone you know) has experienced or experiences any of these incidents, know that you are not alone. UNC Charlotte has staff members trained to support you in navigating campus life, accessing health and counseling services, providing academic and housing accommodations, helping with civil protective orders, and more.

Please be aware that all UNC Charlotte employees, including faculty members, are expected to relay any information or reports of sexual misconduct they receive to the Title IX Coordinator. This means that if you tell me about a situation involving sexual harassment, sexual assault, dating violence, domestic violence, or stalking, I am expected to report the information to the Title IX Coordinator. Although I am expected to report the situation, you will still have options about how your case will be handled, including whether or not you wish to pursue a formal complaint. Our goal is to make sure you are aware of the range of options available to you and have access to the resources you need.

If you wish to speak to someone confidentially, you can contact the following on-campus resources, who are not required to report the incident to the Title IX Coordinator: (1) University Counseling Center (counselingcenter.uncc.edu, 7-0311); or (2) Student Health Center (studenthealth.uncc.edu, 7-7400). Additional information about your options is also available at titleix.uncc.edu under the "Students" tab.

Religious Accommodation:

It is the obligation of students to provide faculty with reasonable notice of the dates of religious observances on which they will be absent by submitting a Request for Religious Accommodation Form to their instructor prior to the census date for enrollment for a given semester http://legal.uncc.edu/policies/ps-134.html . The census date for each semester (typically the tenth day of instruction) can be found in UNC Charlotte's Academic Calendar (http://registrar.uncc.edu/calendars/calendar.htm) .