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 - Queries
- Intermediate SQL - Advanced Queries, Data Manipulation, Built-in Functions
- Advanced DB design topics - Conceptual Database Design, Normalization; Integrity Constraints; Views, Authorization, Privacy, Provenance
- Online Analytical Processing (OLAP) and Data Warehouses
- NoSQL and Cloud Systems
- Database Applications – Health Data, Smartphone/Sensor Data, etc.

Instruction Method

This course will use a combination of self-learning, instruction, and collaborative activities.
Course Materials

Required Textbook:

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

Assignments and Grade Determination

<table>
<thead>
<tr>
<th>Assignment Type</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Quizzes (30%)</td>
<td>There will be regular quizzes on the concepts studied in the previous weeks.</td>
</tr>
<tr>
<td>In-class Activities (20%)</td>
<td>The in-class activities will give you the opportunity to explore one or more concepts in more depth.</td>
</tr>
<tr>
<td>Group Projects (35%)</td>
<td>Two projects will be assigned to apply class concepts in realistic applications.</td>
</tr>
<tr>
<td>Home Assignments (15%)</td>
<td>You will have homework assignments due for almost every class period. Home assignments are to be done individually.</td>
</tr>
</tbody>
</table>

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
- F = below 70%

Class Preparation

This class is designed in a “flipped” manner so that we can spend our valuable class time answering questions, working out problems, and advancing what you learn on your own while preparing for class. That means that you are expected to read assigned material on your own before we meet for class. If you regularly attend class unprepared, please drop this course now and register for another. If you attend class prepared, you are going to learn a lot.

Attendance

The course format is online synchronous. Students are expected to attend every class meeting and participate in the activities (some are graded). No make-up work or extra credit will be set for absences or missed activities. However, life happens. The lowest in-class activity will be dropped.

Students are welcome to discuss with the instructor regarding class absences for 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 of the absence.

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.
Last but not least, information about COVID-19 can be found under “University Policies”.

**Proactive Class Participation**

Proactive class participation and thoughtful discussions are most important in making the course productive and fun. Students with a documented learning disability that would prevent you from participating in class discussion should notify the instructor at the beginning of the semester. All students who have concerns about in-class participation should discuss with the instructor in the first week of class.

**Late Policy**

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.) Work received after two days will receive no credit.

The late penalty equals a 20% reduction to the grade you would have received. For example, if you would have received a grade of 90% for completing one assignment, you will receive a grade of 70% due to late penalty.

**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 written or email notice.

**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.
Absenteism or Tardiness regarding COVID-19:

Students are expected to attend every class and remain in class for the duration of the session when it is safe to do so in accordance with university guidance regarding COVID-19. Failure to attend class or arriving late may impact your ability to achieve course objectives which could affect your course grade. An absence, excused or unexcused, does not relieve a student of any course requirement. Regular class attendance is a student’s obligation, as is a responsibility for all the work of class meetings, including tests and written tasks. Any unexcused absence or excessive tardiness may result in a loss of participation points.

Students are encouraged to work directly with their instructors regarding their absence(s). For absences related to COVID-19, please adhere to the following:

- **If you are sick:** If you test positive or are evaluated by a healthcare provider for symptoms of COVID-19, indicate so on your Niner Health Check to alert the University. Representatives from Emergency Management and/or the Student Health Center will follow up with you as necessary. Submit a copy of your Niner Health Check notification email to your instructors.

- **If you have been exposed** to COVID-19 positive individuals and/or have been notified to self-quarantine due to exposure, indicate so on your Niner Health Check to alert the University. Representatives from Emergency Management and/or the Student Health Center will follow up with you as necessary. Submit a copy of your Niner Health Check notification email to your instructors.

To return to class after being absent due to a period of self-quarantine, students should submit a copy of their Niner Health Check clearance email to their instructor(s). To return to class after being absent due to a COVID-19 diagnosis, students should submit an online request form to Student Assistance and Support Services (SASS). Supporting documentation can be attached directly to the request form and should be from a student's health care provider or the Student Health Center, clearly indicating the dates of absences and the date the student is able to return to class. Instructors will be notified of such absences.

If you are absent from class as a result of a COVID-19 diagnosis or quarantine, as instructor I will do the following to help you continue to make progress in the course: e.g., evaluate the online learning options and assignments on a case-by-case basis. The final decision for approval of all absences and missed work is determined by the instructor.

**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).