**University of North Carolina at Charlotte**
**College of Computing and Informatics**
**Department of Software and Information Systems**

**Course Number and Title:** ITIS 6120: Applied Database

**Credits, Days/Time, Location**: 3 Grad Credits, Fridays 3:30–6:15 p.m., Woodward Hall 155

**Faculty Information**: Xi Niu, Ph.D., Assistant Professor
Office: Woodward 310G
Office Hours: By appointment
Email: xniu2@uncc.edu (preferred way of contact)

**Course Description**
The basic knowledge of modern database. It covers two modules: relational database and XML technologies. Through this course, students are able to represent relational databases in the ER model, query the data using the formal query language SQL, and use XML technologies to store and display data.
The contents include:

- Relational databases with MySQL, ER Model, Extended ER Model, SQL, database normalization, query processing and optimization
- Metadata representations with XML, XML Schema, XSLT, XPath, and XQuery.

**Course Objectives:**
Upon completion of this course, the student will:

1. Understand the concepts of relational databases
2. Apply the ER model or Extended ER model to real-world problems
3. Write SQL commands to manipulate or retrieve data in the relational database
4. Be able to tune database performance and optimize queries
5. Analyze real-word business rules
6. Design functional and efficient relational databases
7. Evaluate a database design
8. Convert a dataset into XML format
9. Apply data schemas to XML data
10. Apply different styles to XML data
11. Write XPath or XQuery statements to retrieve XML data
12. Create a XML database

**Teaching Plan:** Teaching methods include a combination of lectures for concepts, demos for implementations, and in-class quizzes for learning assessment, and activities for sharing ideas.

- 3:30pm ~ 4:00pm In-Class Quiz
- 4:00pm ~ 5:00pm Lecture
- 5:00pm ~ 5:10pm Break
- 5:10pm ~ 6:00pm Lecture
- 6:00pm ~ 6:15pm Q&A, Discussion

**Required Texts:**

| | |
|---|---|
| Title: | Database systems: Design, implementation, management |
| Author(s): | Carlos Coronel and Steven Morris |
| Edition: | 11th Edition |
| Publisher: | Cengage Learning |


(The instructor will provide the electronic copies of all the textbooks)

**Evaluation Methods:**

Students should complete the weekly assigned readings **before** each class. At the beginning of each class, the students will be given a quiz to test their preparedness. During the class, the students should be attentive to class. After the class, students need to finish the homework. During the semester, students will form groups of three to work on a final project.

**Course grading will be based on these activities.**

| **Activities** | **Point** |
|---|---|
| Quizzes | 2 points x13 = 26 points |
| Homework | 4 points x 14 = 56 points |
| Midterm project presentation (group) | 5 points |
| Final presentation (group) | 5 points |
| Final report (group) | 8 points |

**Grade Scale:**
A = 90-100
B = 80 - 90
C = 70 - 80
U = Below 70

**Course Policies:**

**Course Credit Workload.** This 3-credit course requires **three** hours of classroom with direct faculty instruction and **six** hours of out-of-class student work each week for approximately 15 weeks. Out-of-class work may include but is not limited to: required reading, resource research, written assignments, and studying for quizzes, and work on group projects.

**Attendance is mandatory.** A basic requirement of this course is that you will participate in all class meetings, and complete all required course activities and assignments. Class attendance is required. It entails being present and attentive for the entire class period. Attendance shall be taken in every class.
Missing class reduces your grade through the following grade reduction policy: You are allowed two absences. More than two (three or above) absences result in U in the course. For all absences, the student is responsible for all covered materials and assignments.

Absences must be explained with the email **sent to the instructor and cc'ed to the TA** before the beginning of a class.

**Late submissions.** For individual work, late submission (according to the Canvas timestamp and the "late" flag) **will receive a grade of 0**. Team members should plan sufficiently for completing group assignments. Should an emergency arise that greatly disrupts a team's ability to complete an assignment, permission and documentation must be received BEFORE the due date with a plan for submission after the due date.

## UNIVERSITY, COLLEGE AND DEPARTMENTAL POLICIES

**University Policies:**

**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" (Introductory statement from the UNC Charlotte brochure about the Code of Student Responsibility). The entire document may be found at this Internet address:
**http://legal.uncc.edu/policies/ps-104.html**

**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. Students are expected to submit their own work, either as individuals or contributors to a group assignment. Definitions and examples of plagiarism and other violations are set forth in the Code. The Code is available from the Dean of Students Office or online at: http://www.legal.uncc.edu/policies/ps-105.html.

**Disability Services:**
UNC Charlotte is committed to access to education. If you have a disability and need academic accommodations, please provide a letter of accommodation from Disability Services early in the semester. For more information on accommodations, contact the Office of Disability Services at 704-687-0040 or visit their office in Fretwell 230.

**Diversity Statement:**
No student will be discriminated against in the class based upon age, race, nationality, religion, sexual orientation, gender identity/expression, veteran's status, country of origin, or group affiliation. Likewise, all participants in this class will be expected to respect other members who fall into these categories. Any student who does not behave in a respectful manor with their classmates will be withdrawn from the class.

UNC Charlotte strives to create an academic climate in which the dignity of all individuals is respected and maintained. Therefore, we celebrate diversity that includes, but is not limited to

ability/disability, age, culture, ethnicity, gender, language, race, religion, sexual orientation, and socio-economic status.

All students are required to abide by the UNC Charlotte Sexual Harassment Policy (http://www.legal.uncc.edu/policies/ps-61.html) and the policy on Responsible Use of University Computing and Electronic Communication Resources (http://www.legal.uncc.edu/policies/ps-66.html). Sexual harassment, as defined in the UNC Charlotte Sexual Harassment Policy, is prohibited, even when carried out through computers or other electronic communications systems, including course-based chat rooms or message boards.

**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) .

| Date | Lecture | Homework |
|---|---|---|
| Lesson 1<br>1/12 | Overview/Introduction to Database Systems | H1<br>Read Chapter 1 and 3 |
| Lesson 2<br>1/19 | Relational Database Model | H2<br>Read Chapter 4 |
| Lesson 3<br>1/26 | ER Modeling | H3<br>Read Chapter 5 |
| Lesson 4<br>2/2 | Extended ER Modeling | H4<br>Read Chapter 6 |
| Lesson 5<br>2/9 | Normalization of Database Tables | H5<br>Read Chapter 7 |
| Lesson 6<br>2/16 | SQL 1 | H6<br>Read Chapter 8.1- 8.4 |
| Lesson 7<br>2/23 | SQL 2 | H7 |
| 3/2 | Midterm Project Presentation | |
| 3/9 | No class; Spring Break | Read Chapter 10 |
| Lesson 8<br>3/16 | Transaction Management<br>Self-learn Chapter 10<br>Dr. Niu is at NSF | No H8 (credits applied automatically)<br>Read Chapter 11 |
| Lesson 9<br>3/23 | Performance Tuning | H9 |
| 3/30 | No class; Spring Weekend | W3C Tutorial:<br>http://www.w3schools.com/xml/default.asp |
| Lesson 10<br>4/6 | XML Intro | H10<br>Read W3C Tutorial:<br>http://www.w3schools.com/xml/xml_dtd.asp<br>W3C Tutorial:<br>https://www.w3schools.com/xml/schema_intro.asp |
| Lesson 11<br>4/13 | XML DTD and Schema | H11<br>W3C Tutorial:<br>https://www.w3schools.com/xml/xsl_intro.asp |
| Lesson 12<br>4/20 | XSLT | H12<br>Read W3CTutorial:<br>https://www.w3schools.com/xml/xpath_intro.asp<br>Read W3CTutorial:<br>https://www.w3schools.com/xml/xquery_intro.asp |
| Lesson 13<br>4/27 | XQuery and XPath | H13 |
| 5/4 | Final Project Presentation | |