

# CS450/550: Database Concepts Syllabus

Spring 2022

## Instructor and Course Information

<b>Instructor</b> Jian Wu	<b>Email</b> <a href="mailto:jwu@cs.odu.edu">jwu@cs.odu.edu</a>	<b>Office Location &amp; Hours</b> Zoom, 11-12 pm, Mon, or by appt.
<b>Class Time</b> 9:30 pm - 10:45 pm, M/W	<b>Class Location</b> ECSB 2120	<b>Class Period</b> Mon, 1/10/2022-Mon, 4/25/2022
<b>Prerequisites</b> CS381: Discrete Structures. CS330: OOP or CS361: Data Structures and Algorithms	<b>TA</b> TBD	<b>TA Office Hours</b> TBD

## General Information

### Description

As the database management software has become one of the critical components in modern IT applications and systems, a solid understanding of the fundamental knowledge on the design and management of data is required for virtually any IT professionals. In a business setting, such IT professionals should be able to talk to the clients to derive right requirements for database applications, ask the right questions about the nature of their entities and in-between relationships in their business scenarios, analyze and develop an effective and robust design to address business constraints, and react to the existing database designs as new needs arise. Solid understanding of the underlying data models and design issues in data applications are also critical for data science students to access to data for analyzing complex business settings. Modern IT professionals should be able to guide a company in the best use of the diverse database-related technologies and applications for the Big Data era.

As such, CS450/550 aims to prepare Computer Science students for obtaining a fundamental understanding of the database concepts and practical skills to analyze and implement a well-defined database design. In particular, CS450/550 provides an introduction to relational database design, data modeling, SQL query language, and instructors' choices on database applications and advanced concepts. Students will learn to use a real-world open-source database management system. Upon taking CS450/550, students should be able to understand the implications and future directions of databases and database technologies.

The objects are as follows.

- Understand the concepts of data, how to model data, and relational databases
- Learn how to design basic relational databases
- Learn how to implement a database in a database management system
- Learn how to query single and multiple databases using SQL
- Learn how to deploy a search website powered by a relational database

## Course Delivery Method

This course will be delivered in a hybrid manner. Students who chose the face-to-face style will meet in the classroom specified at the top of this syllabus. Students who chose the virtual style will meet on zoom from the ODU Virtual Class Launch Page (<https://online.odu.edu/video/online-class>). All students have access to video recordings from the Class Launch Page after each class. Students who cannot take classes synchronously are required to watch videos before working on homework assignments and projects.

## Grading Policy

Students are graded based on the following aspects.

- Assignments: 35% (7 sets of assignments, 5% each)
- Labs: 30% (6 labs, 5% each)
- Project reports: 20% (4 reports, 5% each)
- Project presentation: 5%
- Course presentation: 5%
- Class attendance and participation: 5%

## Grading Chart

A	A-	B+	B	B-	C+	C*
94-100	90-93.99	87-89.99	84-86.99	80-83.99	77-79.99	74-76.99

Graduate students: see the graduate policies and procedures page for specific requirements of grades

(<https://catalog.odu.edu/graduate/graduatepoliciesandprocedures/>)

## Course Materials

### Required Text

There is no required textbook. Two recommended books are

[Database Concepts 9th Edition](#) by David Kroenke (Author), David Auer (Author), Scott Vandenberg (Author), Robert Yoder (Author)

[Learning SQL: Generate, Manipulate, and Retrieve Data 3rd Edition](#) by Alan Beaulieu (Author)

### Optional Materials

- [Learning PHP, MySQL & JavaScript: With jQuery, CSS & HTML5](#) (Learning PHP, MYSQL, Javascript, CSS & HTML5) 5th Edition by Robin Nixon

### Hardware and Software Requirements

Students will need frequent access to a PC (with Windows 10), a Mac (with MacOS 10.14+), or a Linux (with Ubuntu 20.04 LTS) computer capable of hosting software development activities or of connecting to remote servers where such activities can be performed. For this class, students will connect to virtual machines (VMs) provided by the ODU CCI Academic Environment. Students will be attending network conferences requiring the use of a microphone. Webcams are required. For both remote access to servers and for network conferencing, a good-quality internet connection is important.

Students will have Zoom installed on their computers. The course will introduce students some basic software packages (not including MySQL, which will be hosted on a department provided server). All of these are open-source and free software, but students will need to install some of these on their chosen development machine.

## Course Schedule

Week	Date	Topic	Exercises
1	Monday, 1/10/2022	Course Introduction	
1	Wednesday, 1/12/2022	Concepts of database	Assignment 1
2	Monday, 1/17/2022	<b>Martin Luther King, Jr. Day, no class</b>	
2	Wednesday, 1/19/2022	Relational Model 1	<b>Assignment 1 due</b>
3	Monday, 1/24/2022	<b>Lab1: HTML and PHP Basics</b>	
3	Wednesday, 1/26/2022	Relational model 2	Assignment 2
4	Monday, 1/31/2022	Report 1 specification and student presentation topics	Report 1
4	Wednesday, 2/2/2022	<b>Lab2: PHP Array and HTML Table</b>	
5	Monday, 2/7/2022	SQL1: CREATE and INSERT	<b>Assignment 2 due;</b> Assignment 3
5	Wednesday, 2/9/2022	SQL2: Query a single table	<b>Report 1 due</b>
6	Monday, 2/14/2022	SQL3: Query multiple tables	<b>Assignment 3 due;</b> Assignment 4
6	Wednesday, 2/16/2022	<b>Lab3: insert data using PHP</b>	
7	Monday, 2/21/2022	<b>Lab4: query databases using PHP</b>	
7	Wednesday, 2/23/2022	SQL4: exercises and Report 2 discussion	<b>Assignment 4 due;</b> Assignment 5; Report 2
8	Monday, 2/28/2022	Data modeling and the ER model 1	
8	Wednesday, 3/2/2022	Data modeling and the ER model 2	<b>Assignment 5 due;</b> Assignment 6
9	Monday, 3/7/2022	<b>Spring Holiday, no class</b>	<b>Report 2 due</b>
9	Wednesday, 3/9/2022	<b>Spring Holiday, no class</b>	
10	Monday, 3/14/2022	Topic presentation	
10	Wednesday, 3/16/2022	Topic presentation	<b>Assignment 6 due</b>
11	Monday, 3/21/2022	<b>Lab5: SQL queries</b>	
11	Wednesday, 3/23/2022	Database Design 1	Assignment 7
12	Monday, 3/28/2022	Database Design 2	
12	Wednesday, 3/30/2022	<b>Lab6: user login and access control</b>	<b>Assignment 7 due</b>
13	Monday, 4/4/2022	Report 3 discussion	Report 3
13	Wednesday, 4/6/2022	SQL5: exercises	

Week	Date	Topic	Exercises
14	Monday, 4/11/2022	Report 4 discussion	Report 4
14	Wednesday, 4/13/2022	Invited talk: TBD	Report 3 due;
15	Monday, 4/18/2022	Project time	
15	Wednesday, 4/20/2022	Final presentation	
16	Monday, 4/25/2022	Final presentation	Report 4 (final report) due

\* Course schedules are subject to change depending on availability of speakers and the instructor.

## Exam Schedule

No Midterm or Final exams.

## Additional Information and Resources

### Attendance Policy

**Attendance is required for face-to-face students.** One absence causes a deduction of 1% on attendance until all points are deducted in this aspect. If more than 5 unexcused absences are observed, the student automatically gets an “F” for this course. In case of absence due to legitimate reasons, including but not limited to sickness, University-approved curricular and extracurricular activities (such as athletic contests), career interviews, the death of family members, students should provide official documentation before classes. Makeup classes are unavailable, but students can meet with the instructor in office hours.

### Late Submission Policy

Homework assignments and reports are due at exactly at midnight on the specified dates. Each student has one chance to submit overdue assignments or labs within 24 hours after deadlines without penalty. Students **MUST** provide a reasonable explanation. Submissions after deadlines or beyond grace period are counted 50% of the actual score, e.g., if an assignment earns 90 points, only 45 points are counted.

### Academic Integrity

**Individual assignments must be completed independently.** Students are strongly encouraged to form study groups and to learn from their peers. However, discussion on final proposal writing and presentation in the study group should be limited to general approaches to solutions. **Specific answers should never be discussed.** ODU's policy regarding Academic Integrity must be followed. **Students who violate academic integrity will be reported and receive an “F” for this course.**

- **Cheating:** Using unauthorized assistance, materials, study aids, or other information in any academic exercise (Examples of cheating include, but are not limited to, the following: using unapproved resources or assistance to complete an assignment, paper, project, quiz or exam; collaborating in violation of a faculty member's instructions; and submitting the same, or substantially the same, paper to more than one course for academic credit without first obtaining the approval of faculty).
- **Plagiarism:** Using someone else's language, ideas, or other original material without acknowledging its source in any academic exercise. 4 Examples of plagiarism include, but are not limited to submitting a research paper obtained from a commercial research service, the Internet, or from another student as if it were original work; or making simple changes to borrowed materials while leaving the organization, content, or phraseology intact. Plagiarism also occurs in a group project if

one or more of the members of the group does none of the group's work and participates in none of the group's activities but attempts to take credit for the work of the group.

- **Fabrication:** Inventing, altering or falsifying any data, citation or information in any academic exercise. Examples of fabrication include, but are not limited to, the following: citation of a primary source which the student actually obtained from a secondary source; or invention or alteration of experimental data without appropriate documentation (such as statistical outliers).
- **Facilitation:** Helping another student commit, or attempt to commit, any Academic Integrity violation, or failure to report suspected Academic Integrity violations to a faculty member. An example of facilitation may include circulating course materials when the faculty member has not explicitly authorized their use.

### Copyright

All course materials students receive or to which students have online access are protected by copyright. Students may use course materials and make copies for their own use as needed, but unauthorized distribution and/or uploading of materials without the instructor's express permission is strictly prohibited.

### Disability Accommodation

In order to receive consideration for reasonable accommodations, you must contact the appropriate services office will provide you with an accommodation letter. Please share this letter with your instructors and discuss the accommodations with them as early in your courses as possible. The detail of disability accommodations is documented in [ODU policy #4500](#).

### Discrimination and Harassment

- The university is committed to equal access to programs, facilities, admission and employment for all persons. It is the policy of the university to maintain an environment free of harassment and free of discrimination against any person because of age, race, color, ancestry, national origin, religion, creed, service in the uniformed services (as defined in state and federal law), veteran status, sex, sexual orientation, marital or family status, pregnancy, pregnancy-related conditions, physical or mental disability, gender, perceived gender, gender identity, genetic information or political ideas. Discriminatory conduct and harassment, as well as sexual misconduct and relationship violence, violates the dignity of individuals, impedes the realization of the university's educational mission, and will not be tolerated.
- Gender-based sexual harassment, including sexual violence, are forms of gender discrimination in that they deny or limit an individual's ability to participate in or benefit from University programs or activities. These policies shall not be construed to restrict academic freedom at the university, nor shall they be construed to restrict constitutionally protected expression. The policy is coded in [University Policy #1005](#).