CS 4307: Database Systems

Spring 2022 Syllabus

An introduction to database systems. Topics include the design and implementation of relational databases (B-trees, indexing, query planning and execution, transactions, ACID semantics) as well as data modeling and querying for applications using databases.

Prerequisites

CS 2420, CS 2810, and CS 3005, each with a C or better

Fees

Computer lab access fee: $20, used to assist in maintaining computing infrastructure.

Sections

One section:

1. MWF 10:00–10:50 am in Smith 109
   
   CRN: 20597
   
   Final exam: Monday, May 2 at 9:00 AM

Instructor

Instructor: Dr Russ Ross

Email: russ@dixie.edu

Phone: 435-773-5952 (note: email preferred)

Office: North Burns 226

Office Hours: MWF 11:00 AM–noon, TR 1:00–2:00 PM

Course learning outcomes

At the successful conclusion of this course, students will be able to:

1. Design and implement the major components of a database management system.
2. Analyze the storage needs of a software project and create a data schema and query strategy to address those needs.
3. Construct substantial software that balances requirements of data safety, performance, and complexity.
4. Debate and criticize modern approaches to data management.

Resources

Text

There is one required text for this course:

- Database System Concepts, 7th Edition
  by Abraham Silberschatz, Henry Korth, and S. Sudershan
  ISBN: 9781260084504

Computers

Students are expected to have access to a personal computer running Linux (this includes the Windows Subsystem for Linux) or Mac OS. The instructor will provide basic help setting up the tools and environment for homework, but students are generally responsible for installing and configuring software as well as performing basic troubleshooting and maintenance tasks as needed.
Course web site

This course has an accompanying website. You are responsible for announcements, the schedule, and other resources posted on the website. Grades will be managed using Canvas.

Assignments and exams

Reading

The student is responsible for reading the assigned material. A reading schedule is provided with the class schedule on the course website.

Assignments

There will be a project due almost every week during the semester. Projects are designed to take 10+ hours of work for successful completion. These assignments will involve various activities to promote a deeper understanding of the course materials. Most of the projects build upon previous work, so students who fall behind will not be able to complete the course successfully.

Final project

A final project will take the place of a final exam. You will be expected to start planning and implementing your project early in the semester. No assignments or quizzes will accompany the last unit of the class to give you more time to complete your project. Projects will be presented to the class and passed off during the final exam time slot assigned to the course.

Projects can be completed alone or in pairs. A project topic, completion plan, schedule, and grading criteria must be passed off about six weeks before the end of the semester (see the course schedule).

Grading

Assignments, in-class activities, and exams each contribute to your point total. The assignments and projects comprise 75% of your grade and the final project the remaining 25%.

Letter grades are assigned based on the percentage of possible points attained, according to the following chart:

<table>
<thead>
<tr>
<th>Minimum Percentage</th>
<th>Letter Grade</th>
</tr>
</thead>
<tbody>
<tr>
<td>93</td>
<td>A</td>
</tr>
<tr>
<td>90</td>
<td>A-</td>
</tr>
<tr>
<td>87</td>
<td>B+</td>
</tr>
<tr>
<td>83</td>
<td>B</td>
</tr>
<tr>
<td>80</td>
<td>B-</td>
</tr>
<tr>
<td>77</td>
<td>C+</td>
</tr>
<tr>
<td>73</td>
<td>C</td>
</tr>
<tr>
<td>70</td>
<td>C-</td>
</tr>
<tr>
<td>67</td>
<td>D+</td>
</tr>
<tr>
<td>63</td>
<td>D</td>
</tr>
<tr>
<td>60</td>
<td>D-</td>
</tr>
<tr>
<td>0</td>
<td>F</td>
</tr>
</tbody>
</table>

Course policies

Attendance

Students are responsible for material covered and announcements made in class. School-related absences may be made up only if prior arrangements are made. The class schedule presented is approximate. The instructor reserves the right to modify the schedule according to class needs. Changes will be announced in class. Exams and quizzes cannot be made up unless arrangements are made prior to the scheduled time.

Occasional absences are acceptable as long as the student keeps up with assignment work. Students who miss more than two consecutive weeks of class or who miss more than 20% of scheduled classes during the semester without making prior arrangements will receive a failing grade. Students who miss any scheduled
exam (including midterm exams and the final exam/presentation) or fail to complete a final project without making prior arrangements will receive a failing grade.

This course can only be completed by attending classes and completing all assigned work to a satisfactory level. There is no procedure for testing out of the class.

**Laptops**

Electronics—including laptops—in class have been demonstrated to have a negative impact on student learning (see [Shriram Krishnamurthi's writeup](https://example.com) for background). This class has a NO DISTRACTIONS policy, with a few exceptions:

1. When I ask you to use your laptop (or phone) for a specific activity in class. In this case you are permitted to use it for the duration of the activity, but not during the rest of the class.
2. If you need a laptop to accommodate a disability. If this is the case, please talk to me in advance and please visit the Disability Resource Center to document your need. To help other students in the class, please sit near one of the edges so your laptop does not distract other students more than necessary.

This policy extends to phones, tablets, and other electronic devices. I encourage you to pay full attention to class and take notes on paper.

**Time Commitment**

Courses should require about 45 hours of work per credit hour of class. This class will require about 135 hours of work on the part of the student to achieve a passing grade, which is approximately 9 hours per week. If you do not have the time to spend on this course, you should probably rethink your schedule.

**Late Policy**

The lateness policy of this course is designed to encourage students to stay up-to-date on the current topics and assignments. Each assignment has a soft due date (when students are expected to complete it) and a cutoff date (after which submissions are no longer accepted).

Assignments may be made up after the cutoff date, subject to the following constraints:

1. No old assignments are accepted until the current, active assignment is complete. Students should focus on the current projects, instructional materials, and in-class activities, and only go back to work on older assignments when they are fully caught up or even ahead on current assignments.
2. Old assignments (anything accepted after the initial cutoff date) will be subject to a 25% penalty, which may be waived one time.
3. No late work will be accepted more than a month after its original due date.

**Collaboration**

Limited collaboration with other students in the course is permitted. Students may seek help learning concepts and developing programming skills from whatever sources they have available, and are encouraged to do so. Collaboration on assignments, however, must be confined to course instructors, lab assistants, and other students in the course. Students are free to discuss strategies for solving programming assignments with each other, but this must not extend to the level of programming code. Each student must code his/her own solution to each assignment. See the section on cheating.

**Cheating**

Cheating will not be tolerated, and will result in a failing grade for the students involved as well as possible disciplinary action from the college. Cheating includes, but is not limited to, turning in homework assignments that are not the student’s own work. It is okay to seek help from others and from reference materials, but only if you learn the material. As a general rule, if you cannot delete your assignment, start over, and re-create it successfully without further help, then your homework is not considered your own work.

You are encouraged to work in groups while studying for tests, discussing class lectures, discussing algorithms for homework solutions, and helping each other identify errors in your homework solutions. If you are unsure if collaboration is appropriate, contact the instructor. Also, note exactly what you did. If your actions are determined to be inappropriate, the response will be much more favorable if you are honest and complete in your disclosure.
Where collaboration is permitted, each student must still create and type in his/her own solution. Any kind of copying and pasting is not okay. If you need help understanding concepts, get it from the instructor or fellow classmates, but never copy another’s code or written work, either electronically or visually. The line between collaborating and cheating is generally one of language: talking about solutions in English or other natural languages is usually okay, while discussions that take place in programming languages are usually not okay. It is a good idea to wait at least 30 minutes after any discussion to start your independent write-up. This will help you commit what you have learned to long-term memory as well as help to avoid crossing the line to cheating.

**Special COVID-19 policies**

Students are strongly encouraged to get vaccinated and to wear a face covering that covers both mouth and nose in class and when working in the Smith Computing Center or visiting faculty offices. Students who are ill for any reason should avoid coming to class or otherwise coming into contact with other people, and should work with other students to get notes from missed classes.

**College policies**

Click on this link: [https://catalog.utahtech.edu/academiccalendar/](https://catalog.utahtech.edu/academiccalendar/) for the official academic calendar, which has several important dates you should be aware of.

Click on this link: [https://employees.utahtech.edu/faculty-resources/required-elements-in-dsu-syllabi/](https://employees.utahtech.edu/faculty-resources/required-elements-in-dsu-syllabi/) for links to resources and policies that apply across the entire university.