Spring 2014, CS 4611 Database Management Systems (4.0 cr)

[Catalog] Study of database management fundamentals focusing on the relational data model. Topics include database organization, file organization, query processing, concurrency control, recovery, data integrity, optimization and view implementation.


1. **Course title, number and semester:**
   CS 4611 Database Management Systems, Spring Semester 2014.

2. **Class meeting times and locations:**
   LEC: MWF 3:00-3:50pm  MWAH 175
   LAB: W 4:00-5:50pm  HH306

3. **Instructor:**
   Andrew Brooks, Heller Hall 334, work phone 218-726-7391, e-mail abrooks@d.umn.edu
   **Office Hours:** Monday 1-3pm, Tuesday 1-3pm, Wednesday 1-3pm or walk-in.
   **TA:** Ravi Kiran Ravva  ravva001@d.umn.edu
   **Office Hours:** TBD

4. **Pre-requisites:**
   CS 2511 Software Analysis and Design
   CS 2521 Computer Organization and Architecture
   Students taking CS 4611 must have obtained a passing grade in these courses.

5. **Recommended Textbook:**
   Database System Concepts, 6/e
   Avi Silberschatz, Henry F Korth, S Sudarshan,
   (CS 4611 normally attempts to cover the first 15 chapters and one or two later topics.)
   **Online materials:** will be made available in the Moodle at:
   [https://ay13.moodle.umn.edu/my/](https://ay13.moodle.umn.edu/my/) or moodle.umn.edu
   Students are expected to make full use of online materials. Check on the site once a day.
   **Software:**
   The technology platform is described in Moodle. Students are encouraged to install the “tool chain” on their own machines as the course progresses.

6. **Graded Course Components and Grading**
   There is a mix of individual and group-based assessment. Please note while every effort will be made to adhere to the percentage breakdown indicated, small adjustments might be necessary to better reflect work done.
   - Laboratories 10%  (gradebook L, individual, ~weekly)
   - Homework 10%  (gradebook H, individual, ~weekly)
   - Assignments (4x10%) (gradebook A, some individual/some group, ~ 3-4 week intervals)
   - Mid-term exam 20%  (gradebook M, individual, ~Week 7 )
   - Final exam 20%  (gradebook F, individual, Week 16)
Please note presentations and demonstrations will be used in assessing students’ work. Please note there will be extra-credit opportunities (E), between 5% and 10% in total value. Students are advised to tackle extra-credit opportunities: percentage marks are simply added on to the overall grade calculation. Please note a grade of incomplete (I) will not be issued unless there are extenuating circumstances (see Excused Absences below). **Please note the mid-term might be a practical rather than written examination.**

Please note that should a team member not contribute any work to a component of assessment as a whole, or a sub-component, the submission should list only the names of the authors of the submission and not all team members. **Non-contributing team members will score zero for that component or sub-component.**

The grading scheme is as follows. No scaling will be applied.

- **A** \( \geq 90\% 
- **A-** 87-89%
- **B+** 83-86%
- **B** 80-82%
- **B-** 77-79%
- **C+** 73-76%
- **C** 70-72%
- **C-** 67-69%
- **D+** 63-66%
- **D** 60-62%
- **F** <60%

7. **Final Exam Date and Time**
   TUESDAY May 13 2:00-3:55pm

8. **Special outside-of-class requirements**
   No field trip to a local IT company is currently planned.

9. **Attendance requirements and penalties for non-attendance**
   Students are expected to attend all lectures. There is no penalty for non-attendance of lectures, but please note that there may be occasional extra-credit exercises held during lecture time. Non-attendance means a student misses the extra-credit opportunity. Students are expected to attend all laboratories. Please note that there may be occasional extra-credit exercises held during laboratory time. Non-attendance means a student misses the extra-credit opportunity. Non-attendance on any field trip carries no penalty. Please note there may be extra-credit opportunities associated with any field trip.

10. **Policy on late and make-up work**
    Deadlines associated with assignments and homework are firm. Late submissions associated with assignments and homework score zero. The value of a laboratory drops by half after one
week and to zero after two weeks. (Exceptions are possible e.g. documented absence through illness.)

11. **Statement on participation by students with disabilities**
   
   [http://www.d.umn.edu/access/faculty/basics/#syllabus](http://www.d.umn.edu/access/faculty/basics/#syllabus)

   It is the policy and practice of the University of Minnesota Duluth to create inclusive learning environments for all students, including students with disabilities. If there are aspects of this course that result in barriers to your inclusion or your ability to meet course requirements – such as time limited exams, inaccessible web content, or the use of non-captioned videos – please notify the instructor as soon as possible. You are also encouraged to contact the Office of Disability Resources to discuss and arrange reasonable accommodations. Please call 218-726-6130 or visit the DR website at [www.d.umn.edu/access](http://www.d.umn.edu/access) for more information.

   **N.B. For students with on-going difficulties, Letters of Accommodation should be agreed no later than the 3rd week of semester.**

12. **Supplemental course materials**

   As mentioned earlier, students are expected to make full use of online materials available in the Moodle course site and check on the site at least once a day.

13. **Is the course a liberal education course?**

   CS 4611 is not a liberal education course.

14. **Policies related to teaching and learning**


   **Student Conduct Code:**

   Appropriate classroom conduct promotes an environment of academic achievement and integrity. Disruptive classroom behavior that substantially or repeatedly interrupts either the instructor’s ability to teach, or student learning, is prohibited. Student are expected adhere to Board of Regents Policy: Student Conduct Code: [http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf](http://regents.umn.edu/sites/default/files/policies/Student_Conduct_Code.pdf)

   **Teaching & Learning: Instructor and Student Responsibilities:**

   UMD is committed to providing a positive, safe, and inclusive place for all who study and work here. Instructors and students have mutual responsibility to insure that the environment in all of these settings supports teaching and learning, is respectful of the rights and freedoms of all members, and promotes a civil and open exchange of ideas. To reference the full policy please see: [http://www.d.umn.edu/vcaa/TeachingLearning.html](http://www.d.umn.edu/vcaa/TeachingLearning.html)

   **Academic Integrity:**

   Academic dishonesty tarnishes UMD’s reputation and discredits the accomplishments of students. Academic dishonesty is regarded as a serious offense by all members of the academic community. UMD’s Student Academic Integrity Policy can be found at: [http://www.d.umn.edu/vcaa/StudentAcademicIntegrity.html](http://www.d.umn.edu/vcaa/StudentAcademicIntegrity.html)
Final Exams:
All 1xxx-5xxx courses offered for undergraduate credit should include a final graded component or end of term evaluation that assesses the level of student achievement of one or more course objectives. All final graded components are to be administered or due at the time and place according to the final exam schedule and not during the last week of class. To reference the full policy please see: http://www.d.umn.edu/vcaa/FinalExams.html

Excused Absences:
Students are expected to attend all scheduled class meetings. It is the responsibility of students to plan their schedules to avoid excessive conflict with course requirements. However, there are legitimate and verifiable circumstances that lead to excused student absence from the classroom. These are subpoenas, jury duty, military duty, religious observances, illness, bereavement for immediate family, and NCAA varsity intercollegiate athletics. For complete information, please see: http://www.d.umn.edu/vcaa/ExcusedAbsence.html

Appropriate Student Use of Class Notes and Course Materials:
Taking notes is a means of recording information but more importantly of personally absorbing and integrating the educational experience. However, broadly disseminating class notes beyond the classroom community or accepting compensation for taking and distributing classroom notes undermines instructor interests in their intellectual work product while not substantially furthering instructor and student interests in effective learning. For additional information, please see: http://www.d.umn.edu/vcaa/ClassNotesAppropriateUseof.html

15. Student learning outcomes as they relate to the course objectives
Upon successfully completing this course, a student should be able to:

- write SQL to initialize, populate and query a relational database of modest size and write procedural language extensions to SQL using PL/SQL
- develop entity-relationship models from informally stated requirements and translate entity-relationship models into database schema
- demonstrate an understanding of the theory underpinning relational databases (e.g. relational algebra, functional dependency theory, normalization)
- develop a simple web-based application (e.g. using PHP) which has a server-side database (e.g. Oracle or MySQL)
- demonstrate an understanding of data storage and querying (e.g. B+ trees, query optimization)
- demonstrate an understanding of transaction management (e.g. ACID properties, concurrency control in a multi-user environment)
- demonstrate an understanding of alternatives to relational databases (e.g. key-value pair databases, graph databases, object-oriented databases, XML databases) and of alternatives to standalone client-server architectures (e.g. cloud database services)
Other
a. Students may be required to host some of their work on servers external to the University. (Group work, for example, may use Google Drive or Project Hosting on Google Code to support collaborative working. Other cloud database services may be used for investigative assignments. Note that UMD is in partnership with Google: http://www.d.umn.edu/itss/google/ - go to this site before using any Google functionality.)
b. Students without their own laptop will require use of a high capacity flash drive and be required to take temporary loan of a laptop.
c. 30-60-90 UMD Student Success Roadmap
http://www.d.umn.edu/roadmap/
d. Equal Opportunity & Affirmative Action, Policies and Directives
https://diversity.umn.edu/eoaa/policiesanddirectives

Instructor

Andrew Brooks, Monday, January 20, 2014
http://www.d.umn.edu/~abrooks/