School of Computer Science and Information Systems
44-460/660 Database Systems/Database Design and Implement (3 hours)
Fall 2023

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Textbook and supplementary materials:
Textbook: Modern Database Management (12th Edition) by Jeffrey A. Hoffer, Ramesh Venkataraman, Heikki Topi. Published by Pearson Education, Inc. ISBN: 978-0-13-354461-9.
For residential, undergraduate students this text is available from the campus textbook center. Graduate students enrolled in 44-660 will need to purchase this textbook.
 Software: Students must have access to
 • WinZip or some other software to unzip files downloaded from the course site and to zip files that you are uploading.
 • Apache, PHP, MySQL, and MongoDB -- these are free downloads (instructions for installing will be provided)

Course description: An introduction to database systems, including design, organization, and implementation.

Student learning outcomes:	Assessment methods:
1. Define basic terms used in database management systems	Quizzes and exams.
2. Describe the advantages and disadvantages of using database management systems	Quizzes and exams.
3. Describe the database development process	Quizzes and exams.
4. Understand the basic concepts of logical database design	ER diagram assignments, quizzes, exams.
5. Describe the physical database design process	Quizzes and exams.
6. Incorporate business rules into a conceptual data model	ER diagram assignments, quizzes, exams.

7. Model sophisticated relationships among data, including strong and weak entity types, composite attributes, multivalued attributes, derived attributes, cardinality constraints, unary relationships, binary relationships, ternary relationships, supertypes, subtypes	ER diagram assignments, quizzes, exams.
8. Normalize a set of database tables to third normal form	Normalization problems/assignments, quizzes, exams.
9. Understand the basic concepts of physical database design, including volume estimates, designing fields, denormalization, indexing, and query optimization	Quizzes and exams.
10. Retrieve information from database files using SQL	SQL assignments, SQL exam.
11. Use a DBMS to implement database applications	PHP assignment/project.
12. Design a database to meet the requirements specified by a client	ER diagram assignments.
13. Get exposure/introduction to NoSQL databases using MongoDB	MongoDB assignment.

Instructional methods: Instructional methods include lectures, class discussions, individual work, individual/group study, learner participation, assigned reading/exercises, and help sessions.

Graded course requirements:

Grading Components Points	
Exam 1	60
Exam 2	60
Final Exam (comprehensive)	120
Quiz 1 and 2 @ 30 points each	60
Chapter Assignments (3 @ 30 pts each)	90
SQL Assignments (3 @ 30 pts each)	90
PHP Assignment	65
MongoDB Assignment	20
PHP/MongoDB Quiz	20
Research paper (44660 only)	50
Miscellaneous Points	0-50
Attendence	30
Total Points (44460)	615-665
Total Points (44660)	665-715

Exams and Quizzes: Exams and quizzes must be taken at the scheduled time. Exam dates and times can be found on the course website. If you have to miss an exam, it is your responsibility to notify the instructor in advance and to provide the instructor with written verification of the reason for your absence. Failure to follow these instructions will result in a deduction of points or possibly a grade of zero on the exam or quiz.

Pop Quizzes: Pop quizzes will sometimes be given at the beginning of class. These will be worth about 5-10 points each. If you arrive late to class and miss the quiz, you will receive a 0. You will not be allowed to make up points lost for quizzes unless an official written notice of your absence is provided (i.e. doctor's notification, etc.).

Assignments: Assignments are individual projects. They must be submitted in the appropriate drop box by the due date. Submitting incorrect file results in getting a 0 for that assignemtn. You may talk freely with your classmates, instructor, and class/lab assistants regarding the assignments, but any help received must be fully credited. Failure to credit a source constitutes plagiarism and is subject to the university rules regarding cheating. It is never permissible to copy another person's work. Read the section in this syllabus on academic honesty for details.

Due Dates: Assignments must be turned in by the due date/time. Assignments turned in after the due date will receive no credit. Assignments sent by email to the instructor are not graded. If you have a technical issue, contact your instructor <u>BEFORE</u> the due time with a screenshot showing the issue. The screenshot must show the date and time shown on the lower right of the screen.

Worksheets: All worksheets, including solutions, will be available on the course website. Worksheets are not turned in or graded. However, <u>doing the worksheets will help you perform well on the exams</u>. Use the keys to the worksheets wisely. By the time you take an exam, you should be able to complete all the worksheets without referring to the keys.

Miscellaneous Points: Miscellaneous points consist of any extra points that may be awarded for pop quizzes or other activities. These are not extra credit points. If used, they will be required for the entire class.

Grading scale:

Percentage	Letter Grade
90-100%	A
>= 80% and < 90%	B
>= 70% and < 80%	C
>= 60% and < 70%	D
Below 60%	F

Grading policy: Grades are posted in the online gradebook. You are responsible for checking the gradebook at least once a week to ensure that your grades are properly posted. If there is an error in grading, you must bring that to the attention of the class assistant or instructor *within two weeks of the time the grade is posted*.

Course outline/major topics studied:
The following is a tentative schedule and is subject to change. For exact information, including important dates, check the course website.

Week	Activity
Wk 1	Chapter 1 – The Database Environment and Development Process
Wk 2	Chapter 2 – Modeling Data in the Organization
Wk 3	Chapter 2 Chapter 2 assignment
Wk 4	Chapter 3 – The Enhanced ER Model Chapter 3 assignment
Wk 5	Quiz #1 Chapter 4 – Logical Database Design and the Relational Model
Wk 6	**Exam 1 (covers chapters 1, 2, and 3)** Chapter 4
Wk 7	Chapter 4 assignment Chapter 5 – Physical Database Design and Performance
Wk 8	Quiz #2 Chapter 6 – Introduction to SQL
Wk 9	**Exam 2 (covers chapters 4 and 5)** Chapter 6 SQL Assignment #1
Wk 10	Chapter 7 – Advanced SQL SQL Assignment #2
Wk 11	Chapter 7 SQL Assignment #3
Wk 12	Chapter 8 – Database Application Development HTML PHP
Wk 13	PHP NoSQL using MongoDB PHP Assignment MongoDB Assignment
Wk 14	660 only: Research Project PHP Assignment (cont.) MongoDB Assignment (cont.) PHP Quiz
Final Exam Week	**Final Exam is cumulative**. **Time**: Wednesday, December 6 – 7:30-9:30 a.m

Note: Course schedule is subject to change with instructor notification and students will be responsible for abiding by these changes.

Attendance: Attendance in this course is mandatory. Some in-class exercises may have points associated with them and may not be announced in advance. A student who misses such an exercise due to an unexcused absence will not be allowed to make it up and will receive a zero. Excused absences include attendance at a university sponsored event (documented with an excuse signed by the university sponsor prior to the event)

or by circumstances considered adequately extenuating by the course instructor. It is the responsibility of the student to promptly notify his or her instructor when unable to attend class. Please refer to the university policy on attendance at https://www.nwmissouri.edu/policies/academics/Attendance.pdf

Quizzes: There may sometimes be short quizzes, usually worth five points or less. Quizzes will not always be announced in advance. They will usually be given at the beginning of the class. If you arrive late, after the quiz has started, you cannot take the quiz. If you miss a quiz due to an unexcused absence, you will receive a grade of zero on the quiz. If you have an excused absence, with the required written documentation, grades for missed quizzes will be replaced by the average of the grades of all the quizzes you take during the semester.

Exam Policies: The tentative weeks for exams are given in the course schedule. Exact dates and other details will appear on the course website. If you must miss an exam, it is your responsibility to notify the instructor prior to the exam. Make-ups for written exams will be given only for valid and verifiable reasons. Valid reasons include illness, family emergencies, and university-sponsored trips. Written documentation with suitable verification must be supplied before a make-up will be allowed. All exams are closed book, closed notes, unless explicitly noted in writing by the instructor. No calculators, cell phones, or other electronic devices can be used during exams unless explicitly allowed by the instructor. **If exams are scheduled online with Respondus Monitor, you are responsible for the registration fee.**

Cell phone:
Students should keep their cell phones silent during class and should not be in sight. The prevention includes taking pictures of the whiteboard. It is proven that notes written down are more helpful to learn and remember.

Final exams:
If an emergency occurs that prevents the administration of a course scheduled final examination, the final course grades will be calculated based on the work in the course completed to that point in time and the faculty member's considered judgment. Final exams will not be rescheduled, and a grade of "I" will not be given as a result of an institutional cancellation of a final examination. This final exam policy does not apply to online courses.

Administrative drop: An instructor may request the Office of the Registrar delete a student from a course roster if the student has not met the prerequisite for the course as stated in the catalog, or as a result of non-attendance in the course.

Academic Administrative withdrawal: When it is in the best interest of Northwest Missouri State University for a student to withdraw, a student will be given a W, put on administrative hold, and given notice that they are about to be withdrawn. This action will result in removal of all credits associated with courses that have yet to be completed in the semester in question and the student will be administratively withdrawn from the University. An Administrative Withdrawal does not affect the student's grade point average. Please refer to Northwest Missouri State University's Academic Administrative Withdrawal Policy at: https://www.nwmissouri.edu/policies/academics/Adding-Dropping-Withdrawals.pdf

University communications: Students are expected to use their Northwest student email account for any electronic correspondence within the university. Students are also strongly advised to check their email and CatPAWS accounts on a regular basis.

Academic integrity policy: The students, faculty, and staff at Northwest endeavor to sustain an environment that values honesty in academic work, that acknowledges the authorized aid provided by and intellectual

contributions of others, and that enables equitable student evaluation. Please refer to Northwest Missouri State University's Academic Integrity Policy at http://www.nwmissouri.edu/policies/academics/Academic-Integrity.pdf

Learning or Living Accommodations Request Process: Northwest Missouri State University complies with Section 504 of the Rehabilitation Act of 1973 and the Americans with Disabilities Act of 1990 [ADA] and the ADA Amendments Act of 2008 [ADAAA]. If a student has a documented disability that qualifies under the ADA/ADAAA and requests accommodations, they should review the Accessibility and Accommodations webpage at https://www.nwmissouri.edu/titleixequity/accessibility/index.htm for guidance, including the accommodations application and supporting documentation requirements. Contact ada@nwmissouri.edu or 660.562.1873 for further assistance. For the university policy on disability accommodation refer to http://www.nwmissouri.edu/policies/student/Disability-Accommodation.pdf

Non-discrimination and anti-harassment policy: Northwest Missouri State University is committed to maintaining an environment for all faculty, staff, students, and third parties that is free of illegal discrimination and harassment. Please refer to the Non-Discrimination and Anti-Harassment Policy at https://www.nwmissouri.edu/TitleIXEquity/titlevi/

Family Education Rights and Privacy Act (FERPA) policy: Family Educational Rights and Privacy Act of 1974, as amended (commonly known as the Buckley Amendment), is a federal law which provides that colleges and universities will maintain the confidentiality of student education records. Please refer to the Family Educational Rights and Privacy Act (FERPA) Policy at http://www.nwmissouri.edu/policies/academics/Family-Educational-Rights-and-Privacy-Act.pdf

Behavior and Wellness: Northwest focuses on student success—every student, every day.
The Wellness Center, 660.562.1348, offers free counseling for students coping with depression, anxiety, alcohol or drug misuse, relationships, and other emotional, social, and academic stressors. In addition, faculty, staff, and students who are concerned with student wellbeing can report their concerns, including anonymously, to the Behavioral Intervention Team, so that the student can be offered relevant support, at this link: Concerning Behavior Reporting Form. If you are concerned about the immediate safety of a student, please call the University Police, who have specialized training in intervention, at 660.562.1254.

Disclaimer: Course schedule is subject to change and you will be responsible for abiding by any such changes. Your instructor will notify you of any changes.