# Course Syllabus

**Course Title**
Database Design and Prototyping

**Semester**
Fall 2021

**Course Number**
IS455 – AO

**Instructor**
Kevin Trainor

**Teaching Assistant**
Jinmo Kim

**Regular Class Sessions**
Regular class sessions will be held on Tuesdays from 6:00 PM till 8:00 PM using Zoom. I look forward to joining you there. Please use a headset.

**Optional Online Lab Sessions**
I hold optional online lab sessions two times per week using Zoom. Please join me to ask a question, to discuss solutions to previous assignments, to get help with the current assignment, to discuss the final project, or just to say hello. I will work with students on a first come, first served basis. Please use a headset.

The first optional online lab session of the week takes place immediately following our regular class session. Since class sessions typically end earlier than their scheduled two-hours, I devote the remainder of the time available to helping students. Often, I can stay beyond the two-hour period if many students need help. These online lab sessions are conducted using the same Zoom session as our regular class session.

On Sunday mornings from 9:00 AM till 10:00 AM, I will be holding an optional online lab session using Zoom. I schedule these sessions on Sunday morning because homework assignments are due late Sunday night. I recommend that you give the homework a try by Saturday. Then, if you need help, you can join us on Sunday morning.

Students with special circumstances may contact me to arrange for lab help in an individual meeting with me on Zoom. If you need to arrange an individual meeting with me, please send me an *Individual Meeting Request* via the Service Desk (see *Contacting Instructor or TA* below).

**Office Hours**
I do not hold conventional open office hours. Students needing help with assignments are encouraged to join in the online lab sessions (see above). Students who need to discuss confidential matters can arrange for an individual meeting with me on Zoom. If you need to arrange an individual meeting with me, please send me an *Individual Meeting Request* via the Service Desk (see *Contacting Instructor or TA* below).

**Contacting Instructor or TA**
The preferred method for contacting me or Jinmo is by entering a request using the Service Desk for this course. PLEASE, DO NOT send requests to our regular email addresses.

The Service Desk for this course has been implemented using the JIRA Service Management product. If you are new to using the service desk in one of my courses, please visit the Service Desk Introduction for instructions and tips.

On an emergency basis, you may contact me using my mobile phone number: 847-650-9706.

**Catalog Description**
The course provides students with both theoretical and practical training in good database design. By the end of the course students will create a conceptual data model using entity-relationship diagrams, understand the importance of referential integrity and how to enforce data integrity constraints when creating a database. Students will be proficient in writing basic queries in the structured query language (SQL) and have a general understanding of relational database theory including normalization.

**Course Topics**
- An introduction to relational databases and SQL
- How to use MySQL Workbench and other development tools
- How to retrieve data from a single table
- How to retrieve data from two or more tables
- How to code summary queries
- How to code subqueries
- How to insert, update, and delete data
- How to work with data types
- How to use functions
- Introduction to Data Modeling
- How to design a database
- How to create databases, tables, and indexes
- How to create views
- Using MySQL Workbench to back up and restore a database
- Conceptual Data Modeling
- Logical Database Design Using Normalization

**Learning Outcomes**
After completing this course, you should be able to:

- Identify the advantages of relational database management systems over conventional files and spreadsheets.
- Code SQL queries that extract data from a single table.
- Code SQL queries that extract data from two or more tables.
- Code SQL summary queries.
- Code SQL subqueries.
- Code SQL statements that implement insert, update, and delete functions.

- Identify the standard data types available in relational databases and their typical use.
- Code SQL functions.
- Create databases, tables, and indexes using the Data Definition Language (DDL).
- Create views.
- Backup and restore a database using MySQL Workbench
- Create a non-trivial conceptual data model.
- Create a non-trivial logical database design.

**Required Texts**
Murach, J. (2019). Murach's MySQL (3rd Edition). Fresno, CA: Mike Murach & Associates, Inc. ISBN 978-1-943872-36-7. Digital edition available directly from the publisher at https://www.murach.com/shop/murach-s-mysql-3rd-edition-detail

Oppel, Andrew J. (2010) Data Modeling: A Beginner's Guide New York: McGraw-Hill, ISBN-10: 0071623981, ISBN-13: 978-0071623988

**Technology Requirements**
You will be completing coding assignments and conducting your final project using your own computer. I recommend that you use a computer that runs Windows 10 or a recent release of macOS. While the software that we will be using for this course does run on Linux, there will be substantially less technical support available for Linux. If you want to use a Linux computer for your coursework, please contact me first.

You will be installing the following software on your computers for this class:

- MySQL Server Community Edition
- MySQL Workbench

All of the software and services that you will be using are free for your use during this class. I will publish brief instructions and detailed tutorial videos to help you download, install, and begin using the required software on computers running Windows 10 and recent releases of MacOS. Links to these resources will be provided in our Weekly Schedule.

**Course Schedule**
The schedule for this course will be available via our Weekly Schedule at:

https://courseinfo.ligent.net/2021fa/_illinois/is455_ao/index.html

The course schedule is always subject to reasonable change to account for changes in circumstances and to correct errors. When I make changes to the schedule, I will announce them via our Canvas Announcements Forum. Postings to this forum should result in you being sent an email copy of the announcement as well.

**Course Elements**

1. *Readings*
   Required readings will be assigned from the textbooks listed above and from other resources that will be identified in the Weekly Schedule. Generally, readings are chosen to accompany any lecture or tutorial video provided for the week. So, you should expect to complete the readings before playing the videos.

   This course has two required textbooks (Murach and Oppel). Most of the required reading assignments are from the Murach text. A few required reading assignments are from the Oppel text.

   Please note that when we are covering the material from the Murach book, the readings and the recorded lectures will cover the same material. I have marked both the readings and the lectures as *required*. While many graduate-level courses do not include lectures on the material from the text, some graduate-level learners prefer learning by listening. I invite you to try both the readings and the lectures. Then, **choose the usage pattern that works best for you**.

2. *Live Lectures and Lecture Videos*
   The lectures for this course will be a combination of live lectures that I will deliver during our online sessions and pre-recorded lecture videos. I will be doing live lectures on weeks when we are covering material from the Oppel text. These weeks are at the very beginning and at the very end of the course schedule.

   I have pre-recorded lecture videos for all of the chapters that we will be covering from the Murach text. While most of the material covered in the recorded lectures is from the textbook, I occasionally cover supplemental material in the lectures as well. I always include commentary that I believe adds value to the text.

   As mentioned above, when we are covering the material from the Murach book, the readings and the recorded lectures will cover the same material. I have marked both the readings and the lectures as *required*. While many graduate-level courses do not include lectures on the material from the text, some graduate-level learners prefer learning by listening. I invite you to try both the readings and the lectures. Then, **choose the usage pattern that works best for you**.

   Before playing my lecture videos, make sure that you have previously played *Tips on Playing My YouTube Videos* to assure that you get the most from your viewing experience.

3. *Tutorial Videos*
   I have created tutorial videos for the following use cases:

   - There are a number of tutorials that explain how to do activities necessary for the course. These include installing software, reading grading rubrics, submitting assignments, and related activities.

   - Some tutorials are coordinated with the exercises in your coding assignments. They represent a demonstration of the skill you will be expected to use when doing the exercise.

Because tutorial videos do not duplicate material covered by other resources, I recommend that you always play these recordings. Before playing my tutorial videos, make sure that you have previously played *Tips on Playing My YouTube Videos* to assure that you get the most from your viewing experience.

4. *Coding Assignments*

   There will be weekly Coding Assignments. As mentioned above, coding assignments will sometimes be paired with tutorial videos. These should allow you to complete your Coding Assignment using the same general approach that has been demonstrated in the video.

   A Canvas submission activity will be provided for submitting each assignment. Instructions for each Coding Assignment and a grading rubric will be published in the Weekly Schedule.

   Solutions to Coding Assignments will be posted to our Canvas site just before our next online class session. You can expect us to review your solutions and mine at the beginning of our next class.

   A major goal for this course is to build your proficiency in self-evaluation of your work. To build this skill, I will expect you to be able to estimate your grade on each Coding Assignment. The solutions to coding assignments posted to our Moodle site and our review of those solutions during the next class will serve as your primary feedback for the Coding Assignment.

   As secondary feedback, your Coding Assignment submissions will be graded and commented upon. This feedback will be published to the Moodle assignment submission activity within 2 weeks.

   For information regarding the grading of coding assignments, please see *Coding Assignment Submissions That Meet Certain Criteria Are Subject to a Minimum Score Guarantee* under *Grading Policies* below.

5. *Final Project*

   The Final Project will require you to implement a MySQL database solution to a business problem. You will be given a logical database design document for a database that supports the activities of a small business. You will be responsible for creating a MySQL schema for the database, for loading test data, and for coding a series of SQL scripts.

   The Final Project is an individual assignment, NOT a group assignment. More detailed instructions and a grading rubric for this assignment will be published separately.

6. *Attendance*
   The iSchool expects students to attend all classes except in cases of emergency. See *Student Code on Attendance:* http://studentcode.illinois.edu/article1/part5/1-501/. Students who miss class are expected to play the recording of the class. If you need help locating the recording of a class, please contact the iSchool Help Desk.

7. *Participation*
   Your participation in the course is an important element of the course. Accordingly, a significant portion of your grade for this course will be determined by your participation. Students will earn participation credit for:

   - Making a *Greetings* post to the Service Desk during the first 2 weeks of the course.
   - Making speaking contributions during class.
   - Making chat contributions during class.
   - Presenting your solution to the assignment during class.
   - Presenting as the spokesperson for a breakout group during class.

   For information regarding the grading of participation, please see *Your Participation Grade Will Be Based Upon Participation Points Earned Throughout the Semester* under *Grading Policies* below.

**Course Grading Policies**

1. *iSchool and University Grading Policies Apply*
   Many iSchool and University Academic Policies have grading implications. Please see *iSchool and University Academic Policies* below.

2. *Careful Attention to Detail is Required*
   One important goal of this course is to train you to become a responsible information professional. The work of information professionals is highly detail oriented. Clients rely on information professionals to deliver a correct work product that conforms to stated requirements and best practices.

   When your work is graded, deductions will be made for all deviations from the assignment instructions. Some of these deductions will be made for small deviations that may seem insignificant to you. So, it is a good practice to carefully check your work against all instructions before submitting.

3. *Assignment Resubmissions are Not Permitted*
   I have designed the grading policies for coding assignments such that poor performance on one coding assignment should not spoil your entire semester grade (see below). Consequently, each assignment may only be submitted one time.

4. *Deadline Extensions Must be Requested Before the Deadline*
   If you believe that you have a valid reason for a deadline extension, please submit a *Deadline Extension Request* using the Service Desk before the deadline. I have a practice of granting reasonable extension requests. I will only grant extensions beyond the beginning of our next class session in very limited circumstances.

5. *Deductions Will be Made for Late Submissions*
   The grading rubrics for coding assignments and for the Final Project include substantial deductions for late submissions. Please see the assignment grading rubrics for more details.

6. *Assignments Submitted Too Late Will Not be Graded*
   Coding assignments submitted more than 14 days late will be considered *too late.* Final Projects submitted more than 7 days late will be considered *too late*. Assignments that are submitted *too late* will not be graded. These submissions will earn a grade of zero. If you are in danger of missing the *too late* deadline, and you believe that you have a valid reason for an extension, please submit a *Deadline Extension Request* using the Service Desk before the deadline.

7. *Grade Adjustments Will Be Limited to Automatic Rounding*
   All grades will be awarded on 0 to 100-point scale. Fractional values will be rounded automatically. Fractional portions of grades ending in .0 through .4 will be rounded down. Fractional portions of grades ending in .5 through .9 will be rounded up.

   No further adjustments will be made to grades. This policy applies even in situations where increasing a grade by just 1 point would cause a student's final letter grade for the course to cross a threshold (i.e. from B+ to A-). Regardless of the potential consequences, grade adjustments will be limited to automatic rounding.

8. *Re-Grading Requests Made Using the Service Desk Will be Given Fair Consideration*
   It is possible for one of your assignment submissions to be missed during the grading process. This is especially true for assignments that are submitted late. If this happens to you, please submit a Re-Grading Request to the Service Desk to remind us that your submission still needs grading. Make sure to fully identify the assignment that needs attention.

   Each assignment that we grade is accompanied by a grading feedback form. Please read this feedback to understand our grading decisions. If, after reading the grading feedback form, you believe that our grading decisions are somehow unfair, please submit a Re-Grading Request to the Service Desk. Include details in your request that identify the assignment and your rationale for the re-grading request. We will give these requests fair consideration and inform you of our determination by posting back to the Service Desk ticket.

9. *Extra Credit Opportunities are Not Available*
   I have designed the grading policies for coding assignments such that poor performance on one coding assignment should not spoil your entire semester grade (see below). Consequently, I do not offer any opportunities to submit work for extra credit.

10. *Coding Assignment Submissions that Meet Certain Criteria are Subject to a Minimum Score Guarantee*

    The grading rubric for Coding Assignments has been designed to promote two important behaviors:

    - Submitting your work in a properly named and formatted file. This helps substantially with grading workflow.

    - Submitting your work by the assignment deadline. This assures that you will get the benefit of having tried to solve the problem on your own before seeing the solutions of others.

    While separate grading rubric and assignment submission instructions documents will be published, the following is a summary of the coding assignment grading rubric features:

    - 10 points will be awarded for submitting a single, properly named and properly formatted file to the proper Canvas assignment submission activity.

    - A minimum of 75 points will be awarded for submissions that are submitted on time, and that demonstrate a good faith effort on all parts of the assignment. Late submissions will be awarded 74 points or fewer in this category.

    The implication of this grading scheme is that you can expect a score of 85 or higher on all coding assignment submissions that meet both criteria.

*11. Your Participation Grade Will Be Based Upon Participation Points Earned Throughout the Semester*

The table below lists activities for which you may earn participation points and the points earned for each instance.

| Activity | Points Earned |
|---|---|
| A *greetings* post made to the Service Desk for this course by the end of Week 2 | 10 |
| 1 post or reply made in the *Open Discussion* forum. | 1 |
| 1 speaking contribution during class | 2 |
| 1 chat contribution during class | 1 |
| 1 presentation of your Coding Assignment solution during class | 5 |
| 1 presentation as spokesperson for your a breakout group during class | 5 |

Your participation grade for the course will be calculated at the end of the semester based upon the total number of participation points earned. Grading will be done on a curve. A student with the highest number of participation points can expect to earn a grade of 100. A student with the median number of participation points can expect to earn a grade of 85. Students with fewer than 10 participation points can expect to earn a grade of 0.

*12. Attendance at Class Sessions May Affect Your Grade*

While attendance is not graded directly, it may have a significant impact on your participation grade. Nearly all activities that earn participation credit occur during class.

**Basis for Determining Grade**
The various components of student work will contribute to the final grade based upon the following percentages:

- Participation 10%
- Coding assignments 45%
- Final project 45%

Letter grades will be determined as follows:

- A+ 97 - 100%;
- A 93 - 96%;
- A- 90 - 92%;
- B+ 87 - 89%;
- B 83 - 86%;
- B- 80 - 82%;
- C+ 77 - 79%;
- C 73 - 76%;
- C- 70 - 72%;
- D+ 67 - 69%;
- D 63 - 66%;
- D- 60 - 62%;
- F 0 - 59%;

Please note that when converting overall course number grades to letter grades, simple rounding of number grades will be used. Please see *Grade Adjustments Will Be Limited to Automatic Rounding* under *Grading Policies* above.

## ISCHOOL AND UNIVERSITY ACADEMIC POLICIES

**Incomplete Grades**
An exceptional request for an incomplete grade is most often granted to students encountering a medical emergency or other extraordinary circumstances beyond their control. Students must request an incomplete grade from the instructor. The instructor and student will agree on a due date for completion of coursework. The student must submit an Incomplete Form signed by the student, the instructor, and the student's academic advisor to the front office:
https://uofi.app.box.com/s/sx7arobhr0gfw12teaetmp1qq32ifdrd
Please see the Student Code for full details:
http://studentcode.illinois.edu/article3/part1/3-104/

**Academic Integrity**
The iSchool has the responsibility for maintaining academic integrity so as to protect the quality of education and research in our school and to protect those who depend on our integrity. Consequences of academic integrity infractions may be serious, ranging from a written warning to a failing grade for the course or dismissal from the University.
See the student code for academic integrity requirements:
http://studentcode.illinois.edu/article1/part4/1-401/

**Statement of Inclusion**
https://diversity.illinois.edu/about/senate-diversity-resolution/
As the state's premier public university, the University of Illinois at Urbana-Champaign's core mission is to serve the interests of the diverse people of the state of Illinois and beyond. The institution thus values inclusion and a pluralistic learning and research environment, one which we respect the varied perspectives and lived experiences of a diverse community and global workforce. We support diversity of worldviews, histories, and cultural knowledge across a range of social groups including race, ethnicity, gender identity, sexual orientation, abilities, economic class, religion, and their intersections.

**Religious Observances**
In keeping with our Statement of Inclusion and Illinois law, the University is required to reasonably accommodate its students' religious beliefs, observances, and practices in regard to admissions, class attendance, and the scheduling of examinations and work requirements.

If you anticipate the need for an accommodation, please communicate with your instructor in the first two weeks of class. If you are an undergraduate student and your instructor requires an absence letter, you must fill out the Religious Observance Accommodation Request form:
https://cm.maxient.com/reportingform.php?UnivofIllinois&layout_id=19 . Other accommodations may be available.

**Accessibility Statement**
To obtain accessibility-related academic adjustments and/or auxiliary aids, students with disabilities must contact the course instructor and the Disability Resources and Educational Services (DRES) as soon as possible. To contact DRES you may visit 1207 S. Oak St., Champaign, call 333-4603 (V/TTY), or e-mail a message to disability@uiuc.edu .

**COVID-19 Statement**
In keeping with university and iSchool policy, all students are required to engage in appropriate behavior to protect the health and safety of our community. If you are on campus, this includes being fully vaccinated, wearing a facial covering properly when required, maintaining social distance, if requested, and using hand sanitizer as needed.

If you feel ill or are unable to come to class or complete class assignments due to issues related to COVID-19, including but not limited to testing positive yourself, feeling ill, caring for a family member with COVID-19, or having unexpected child-care obligations, you should contact the instructor immediately and cc your advisor.

**Contact Hours**
This course will require approximately 54 contact hours.

**Last Revised**
2021-08-11