CS 411  **Database Systems**  credit: 3 OR 4 hours.

Examination of the logical organization of databases: the entity-relationship model; the hierarchical, network, and relational data models and their languages. Functional dependencies and normal forms. Design, implementation, and optimization of query languages; security and integrity; concurrency control, and distributed database systems. 3 undergraduate hours. 3 or 4 graduate hours.

Prerequisite: CS 225.

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Restricted to MS: Civil Engr - Online - UIUC, MCS:Computer Sci Online -UIUC, MS:Mechanical Engineering -UIUC, MS: Aerospace Engr-Online-UIUC, NDEG:Grad Nondegree-CE-UIUC, NDEG:Undergrad Nondeg-CE-UIUC, or MCS: Computer Sci Online-UIUC. Restricted to online non-degree, online MCS, online MSAE, online MSME, and online MSCE students. For more details on this course section, please see [http://engineering.illinois.edu/online/courses/](http://engineering.illinois.edu/online/courses/).

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Credit Hours: 3 hours

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Credit Hours: 4 hours
Restricted to Graduate - Urbana-Champaign.

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Credit Hours: 3 hours
Instructor Approval Required
This section is an overflow section for the the main lecture. Students will watch the lectures online and take the exams with the main lecture. Instructor approval is required to registered for this section.

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Credit Hours: 4 hours
Instructor Approval Required
Restricted to Graduate - Urbana-Champaign.
This section is an overflow section for the the main lecture. Students will watch the lectures online and take the exams with the main lecture. Instructor approval is required to registered for this section.