

# Database Systems: Concepts, Design, and Implementation

## ISE 382 (4 Units)

---



**Fall 2015**

### Description

Data model for industry applications. Modeling and designing robust databases. Implementing and querying databases with SQL. Innovations in database applications.

### Objective

To prepare students to model and build databases. Upon completion of the course, students will be able to:

1. Create relational data models
2. Perform normalization to eliminate anomalies
3. Convert models to functioning databases
4. Use Structured Query Language (SQL) to build and query databases
5. Demonstrate effective use of
  - Microsoft SQL Server DBMS
  - MySQL DBMS
  - Teradata DBMS
6. Test and validate database implementation with transactions
7. Explain how database transactions are controlled in multiuser environments
8. Describe database security and maintenance
9. Describe the innovations and uses of databases in diverse applications

### Prerequisites

None.

### Instructor

Nathan Greenfield (ngreenfi@usc.edu)

### Teaching Assistant

Adarsh Rajguru (arajguru@usc.edu)

### Office Hours

Listed on Blackboard under Contacts

### Lecture

5:00pm – 6:20pm, Tuesday and Thursday in VKC152

### Discussion

9:30am – 10:50am, Friday in KAP267

11:00am – 12:20am, Friday in KAP267

## Textbook

*Database Systems, 11th Edition*. Coronel and Morris. Cengage Learning, ISBN 978-1-285-19614-5.

Additional material can be found at Safari Books Online:

<http://www.usc.edu/libraries/databases/records/database.php?db=AK3>

## Website

All course material will be posted on Blackboard (<http://blackboard.usc.edu>).

We will use Piazza for discussions/questions outside of class.

## Grading

The following percentage breakdown will be used in determining the grade for the course.

Labs (percentages vary)	5%
Homework (percentages vary)	15%
Exam 1	15%
Exam 2	15%
Project 1	10%
Project 2	15%
Final Project	25%
<b>Total</b>	<b>100%</b>

## Grading Scale

The following shows the grading scale to be used to determine the letter grade.

93% and above	A
90% - 92%	A-
87% - 89%	B+
83% - 86%	B
80% - 82%	B-
77% - 79%	C+
73% - 76%	C
70% - 72%	C-
69%	D+
67% - 68%	D
66%	D-
65% and below	F

## **Policies**

### **Assignments**

Each assignment must be completely individually. There are no group projects in this class.

The assignments will be posted on Blackboard in the “Assignments” section. Each assignment will include instructions, a due date, and a link for electronic submission. Assignments must be submitted using this link.

It is your responsibility to submit your assignments on or before the due date. Assignments turned in one day late will have 20% of the total points deducted from the graded score. Assignments turned in two days late will have 50% of the total points deducted from the graded score. After two days, submissions will not be accepted and you will receive a 0.

All assignments must be digitally submitted through Blackboard except when otherwise specified by the course staff. Do not email assignments to the instructor or lab assistant.

Assignment questions should be posted to the online question forum. Do not send any email to the instructor regarding assignments or ask specific assignment questions during the lecture sessions. You are encouraged to attend the instructor’s office hours for assignment related questions.

### **Lab practicals**

There will be lab practicals during most discussion sessions. These practicals will be immediate application of the material presented in lecture. These practicals will be graded as pass/fail. For credit on each practical you must complete the practical before discussion time has ended. Each practical will contribute to your overall grade. There is no way to make up a missed practical, however a practical grade can be dropped provided either prior instructor approval or a documented emergency.

### **Projects**

There are three projects in all. All projects are group projects. Teams of 2 students each will be formed after the 1<sup>st</sup> exam. The three projects are separate projects although they use similar skills. The project scenarios are different. The projects are not demonstrated to the class, rather the instructor/TA will evaluate the working databases on the Viterbi IT provisioned servers. So the demo is a virtual one. Each project will have its own grading rubric.

## Policies (continued)

### Exams

Make-ups are only allowed under extraordinary circumstances. Students must provide a satisfactory reason (as determined by the instructor) along with proper documentation. There are two exams. These exams are comprehensive of all topics covered.

### Lab facilities

You are encouraged to save your work using a USB flash drive or a website such as Dropbox. You must keep a copy of all coursework. You will not be able to save your work on the ITP lab computers. Any work saved to the computer will be erased after restarting the computer.

The class staff is not responsible for any work lost.

Furthermore, students will be able to install all of the necessary software on their own computers in order to be able to work on the homework at any time. Both Mac and PC are supported. Students without their own personal computers are able to utilize the 24-hour USC computing centers.

## Incomplete and Missing Grades

Excerpts for this section have been taken from the University Grading Handbook, located at <http://www.usc.edu/dept/ARR/grades/gradinghandbook/index.html>. Please see the link for more details on this and any other grading concerns.

A grade of Missing Grade (MG) “should only be assigned in unique or unusual situations... for those cases in which a student does not complete work for the course before the semester ends. All missing grades must be resolved by the instructor through the Correction of Grade Process. One calendar year is allowed to resolve a MG. If an MG is not resolved [within] one year the grade is changed to [Unofficial Withdrawal] UW and will be calculated into the grade point average a zero grade points.”

A grade of Incomplete (IN) “is assigned when work is not completed because of documented illness or other ‘emergency’ **occurring after the twelfth week** of the semester (or 12th week equivalency for any course scheduled for less than 15 weeks).”

## **Statement on Academic Conduct and Support Systems**

### **Academic Conduct**

Plagiarism – presenting someone else’s ideas as your own, either verbatim or recast in your own words – is a serious academic offense with serious consequences. Please familiarize yourself with the discussion of plagiarism in SCampus in Section 11, Behavior Violating University Standards <https://scampus.usc.edu/1100-behavior-violating-university-standards-and-appropriate-sanctions/>. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, <http://policy.usc.edu/scientific-misconduct/>.

Discrimination, sexual assault, and harassment are not tolerated by the university. You are encouraged to report any incidents to the Office of Equity and Diversity <http://equity.usc.edu/> or to the Department of Public Safety <http://capsnet.usc.edu/departments/departments-public-safety/online-forms/contact-us>. This is important for the safety whole USC community. Another member of the university community – such as a friend, classmate, advisor, or faculty member – can help initiate the report, or can initiate the report on behalf of another person. The Center for Women and Men <http://www.usc.edu/student-affairs/cwm/> provides 24/7 confidential support, and the sexual assault resource center webpage [sarc@usc.edu](mailto:sarc@usc.edu) describes reporting options and other resources.

### **Support Systems**

A number of USC’s schools provide support for students who need help with scholarly writing. Check with your advisor or program staff to find out more. Students whose primary language is not English should check with the American Language Institute <http://dornsife.usc.edu/ali>, which sponsors courses and workshops specifically for international graduate students. The Office of Disability Services and Programs [http://sait.usc.edu/academicsupport/centerprograms/dsp/home\\_index.html](http://sait.usc.edu/academicsupport/centerprograms/dsp/home_index.html) provides certification for students with disabilities and helps arrange the relevant accommodations. If an officially declared emergency makes travel to campus infeasible, USC Emergency Information <http://emergency.usc.edu/> will provide safety and other updates, including ways in which instruction will be continued by means of blackboard, teleconferencing, and other technology.

# Database Systems: Concepts, Design, and Implementation

## ISE 382(4 Units)

---

### Course Outline

Note: Schedule subject to change

W	Date	Topic(s)	Assignment
1	8/25	Intro; History of databases	<i>Read:</i> Coronel 1, 2
	8/27	The relational model	<i>Lab:</i> LP #1
	8/28	1 <sup>st</sup> query using Excel	<i>Do:</i> HW 1 (Tool chain install)
2	9/1	Data modeling terms	<i>Read:</i> Coronel 3
	9/3	Data modeling concepts	<i>Lab:</i> LP #2
	9/4	Excel spreadsheets to database tables	<i>Do:</i> HW2 (Dependency analysis)
3	9/8	Data modeling (part 1)	<i>Read:</i> Coronel 4, 5
	9/10	Data modeling (part 2)	<i>Lab:</i> LP #3
	9/11	Extend ER diagrams from class	<i>Do:</i> HW3 (ER diagrams)
4	9/15	Normalization	<i>Read:</i> Coronel 6
	9/17	Normal forms (part 1)	<i>Lab:</i> LP #4
	9/18	Normalization exercises	<i>Do:</i> HW4 (Normalization & ERD)
5	9/22	Normal forms (part 2)	<i>Read:</i> TBD from Safari
	9/24	Database performance; CRUD	
	9/25	Exam 1 prep	
6	9/29	<b>Exam 1</b>	<i>Read:</i> TBD from Safari
	10/1	Structured Query Language	<i>Do:</i> Project 1 assigned (due W9)
	10/2	Exam 1 review	
7	10/6	SQL reads: SELECT statements	<i>Read:</i> Coronel 7
	10/8	SQL reads: qualified SELECT statements	<i>Lab:</i> LP #5
	10/9	Queries using MS SQL on VDI	
8	10/13	SQL reads: subqueries	<i>Read:</i> Coronel 8
	10/15	SQL reads: joins	<i>Lab:</i> LP #6
	10/16	Queries using MS SQL on VDI	
9	10/20	Create, Read, Update, Delete with SQL	<i>Read:</i> TBD from Safari
	10/22	Advanced SQL: triggers, stored procedures	<i>Do:</i> Project 2 assigned (due W12)
	10/23	Project 1 debugging, Project 2 discussion	
10	10/27	Extract, Transform, Load	<i>Read:</i> Coronel 10
	10/29	Multiuser databases	
	10/30	Project 2 debugging	
11	11/3	Database security	<i>Read:</i> Coronel 13, 15
	11/5	Business intelligence systems	

	11/6	Exam 2 prep	
12	11/10	<b>Exam 2</b>	<i>Read:</i> TBD from Safari
	11/12	About Teradata	<i>Do:</i> Final project assigned (due Finals)
	11/13	Exam 2 review, Project 2 debugging	
13	11/17	Database application structure	<i>Read:</i> Coronel 14, TBD from Safari
	11/19	Database applications	
	11/20	Final project debugging	
14	11/24	Final project debugging	<i>Read:</i> TBD from Safari
	11/26	Thanksgiving (No class)	
	11/27	Thanksgiving (No class)	
15	12/1	Beyond relational databases	
	12/3	The future of databases	
	12/4	Final project debugging	
<b>FINAL PROJECT – due 12/10 @ 6:30pm</b>			