



ISE 559 Data Management
Fall 2021
Location: OHE 136

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Catalog Description

Function, design, and use of modern data management systems, including cloud; data management techniques; data modeling; network attached storage, clusters and data centers; relational databases; the map-reduce paradigm.

Learning Objectives and Outcomes

- Develop an advanced level of proficiency with all the activities associated with managing data with an emphasis on data preparation for analytics.
- Primary focus areas of the class are developing proficiency in the use of Structured Query Language (SQL), data modeling, and DataMart implementation (data integration, cleaning, reduction, and enhancement).
- Introduce modern NoSQL, semi-structured, unstructured, and cloud based data management systems.

Prerequisite(s): None

Recommended Preparation: ISE 225 (Engineering Statistics I) or equivalent, working knowledge of a programming language.

Course Notes

The course material is available on Blackboard.

Technological Proficiency and Hardware/Software Required

This class will use the sqlite relational database management system for SQL programming exercises. This is a free open source system that will be installed on the student's computer.

Textbooks

There are no mandatory texts for this class. It is intended that the PowerPoint materials presented in class cover all the content required. However, students are encouraged to consult the texts that the material is based on for clarification and elaboration.

The material in the course is primarily drawn from the following texts:

- Beaulieu, *Learning SQL: Generate, Manipulate, and Retrieve Data*, 3rd Edition, O'Reilly, 2020, (LSQL)
- Kimball & Ross, *The Data Warehouse Toolkit*, Wiley, 2013 (DWT)
- Svoboda, *Data Preparation for Analytics Using SAS*, SAS Press Series, 2006 (DPA)

Description and Assessment of Assignments

- **Seven homework assignments (one per module)** - 50% of final grade
- **Mid-term exam** – 20% of final grade (covering Modules 1 – 4)
- **Final exam** - 30% of final grade

Grading Scale (Course final grades will be determined using the following scale)

A	95-100	B-	80-82	D+	67-69
A-	90-94	C+	77-79	D	63-66
B+	87-89	C	73-76	D-	60-62
B	83-86	C-	70-72	F	59 and below

Class Participation: Up to 2 additional points on the overall course grade may be awarded for students based on active class participation.

Assignment Submission Policy

Assignments will all be distributed and submitted via blackboard. Email submissions and late submissions are not allowed without prior approval.

Timeline and Rules for submission

Assignments are to be returned the week after submission. Solutions will be released soon after the homework submission date.

Course Schedule: A Weekly Breakdown

Week	Date	Topics/Daily Activities	Assignments	References
1	8/27	Module 1: Introduction to Data Management/ Data Infrastructure	Module 1 HW Assigned	
2	9/3	Module 2: Relational DBMS and SQL	Module 1 HW Due	LSQL
3	9/10			
4	9/17		Module 2 HW Assigned	
5	9/24	Module 3: Data Architecture	Module 2 HW Due Module 3 HW Assigned	DWT
6	10/1	Module 4: Data Modeling	Module 3 HW Due	DQT
7	10/8		Module 4 HW Assigned	
8	10/22	Mid-Term (90 minutes) Module 5: Analytic Datamart Implementation	Module 4 HW Due	DPA
9	10/29			
10	11/5		Module 5 HW Assigned	
11	11/12	Module 6: Semi-Structured Data	Module 5 HW Due Module 6 HW Assigned	TBA
12	11/19	Module 7: Unstructured Data	Module 6 HW Due Module 7 HW Assigned	TBA
13	12/3	Module 8: Data Governance Final Exam Review	Module 7 HW Due	TBA
Final	12/13	Final Exam (8:00AM – 10:00AM)		

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 Part B, Section 11, “Behavior Violating University Standards” policy.usc.edu/scampus-part-b. Other forms of academic dishonesty are equally unacceptable. See additional information in SCampus and university policies on scientific misconduct, 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/department/departement-public-safety/online-forms/contact-us>. This is important for the safety of the 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 <http://sarc.usc.edu> describes reporting options and other resources.

Support Systems:

Student Health Counseling Services - (213) 740-7711 – 24/7 on call
engemannshc.usc.edu/counseling

Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

National Suicide Prevention Lifeline - 1 (800) 273-8255 – 24/7 on call
suicidepreventionlifeline.org

Free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week.

Relationship and Sexual Violence Prevention Services (RSVP) - (213) 740-4900 – 24/7 on call
engemannshc.usc.edu/rsvp

Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) | Title IX - (213) 740-5086
equity.usc.edu, titleix.usc.edu

Information about how to get help or help a survivor of harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants. The university prohibits discrimination or harassment based on the following protected characteristics: race, color, national origin, ancestry, religion, sex, gender, gender identity, gender expression, sexual orientation, age, physical disability, medical condition, mental disability, marital status, pregnancy, veteran status, genetic information, and any other characteristic which may be specified in applicable laws and governmental regulations.

Bias Assessment Response and Support - (213) 740-2421
studentaffairs.usc.edu/bias-assessment-response-support

Avenue to report incidents of bias, hate crimes, and microaggressions for appropriate investigation and response.

The Office of Disability Services and Programs - (213) 740-0776

dsp.usc.edu

Support and accommodations for students with disabilities. Services include assistance in providing readers/notetakers/interpreters, special accommodations for test taking needs, assistance with architectural barriers, assistive technology, and support for individual needs.

USC Support and Advocacy - (213) 821-4710

studentaffairs.usc.edu/sssa

Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity at USC - (213) 740-2101

diversity.usc.edu

Information on events, programs and training, the Provost's Diversity and Inclusion Council, Diversity Liaisons for each academic school, chronology, participation, and various resources for students.

USC Emergency - UPC: (213) 740-4321, HSC: (323) 442-1000 – 24/7 on call

dps.usc.edu, emergency.usc.edu

Emergency assistance and avenue to report a crime. Latest updates regarding safety, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible.

USC Department of Public Safety - UPC: (213) 740-6000, HSC: (323) 442-120 – 24/7 on call

dps.usc.edu

Non-emergency assistance or information.