ITP 249: Introduction to Data Analytics
Units: 4, Spring 2025

Mon 5:00 pm - 8:20 pm, SLH 102

Instructor: Naz Nageer
Office Hours: To posted on Blackboard
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Teaching Assistants:
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TA Office hours: To posted on Brightspace

IT Help:
USC IT (ITS): https://itservices.usc.edu/contact/
Viterbi IT: https://viterbi.usc.edu/resources/vit/contact-us.htm

Course Description
Data is now an integral part of our lives and to be successful in today's business landscape, we need to be able to leverage data to make critical business decisions. This course will teach students how to use data to make those decisions confidently.

Learning Objectives
After completing this course, students will be able to:
- Use Excel, SQL, NoSQL and leading industry tools
- Collect, clean, and analyze data from multiple sources
- Pose questions, collect relevant data, analyze data, interpret data and provide insights
- Present data-driven insights using data visualization and dashboards
- Use statistical techniques to gain insights

Prerequisite(s): None

Course Notes
Lecture slides and any supplemental course content will be posted to Blackboard. All announcements for the course will be posted to Blackboard. Information about assignments, due dates, exams and grades will also be posted on Blackboard. Students should check Blackboard regularly for updates.

Zoom?
There will be no remote attendance option, nor will there be any recordings of the lecture. Students are expected to attend lectures in-person.

Technological Proficiency and Hardware/Software Required
Most assignments in the class are done using software. Software will be provisioned for download or available through a virtual lab. Students are expected to have access to a computer. ITP has a limited number of laptops that students can request to borrow.

Optional Books

Carlos Coronel, Steven Morris. *Database Systems: Design, Implementation, and Management*. Boston, MA: Cengage Learning, 2018. ISBN-13: 978-1337627900

Additional reference material will be provided in class as needed.

Description and Assessment of Assignments
This course will make use of Blackboard for assignments. All assignments will be posted on Blackboard. Assignment will include instructions, a due date, and a link for electronic submission. Assignments must be submitted using this link.

Grading Breakdown
The weight of the graded material during the semester is listed below:

Item	% of Grade
Individual Assignments	25
Group Projects	10
Exam I	30
Exam II	35
Total	**100**

Grading Timeline
Assignments Grading will typically be completed 7 days after submission. Any variations will be announced in class or on blackboard. All grading discrepancies must be resolved within a week of grade release.
For grade disputes, contact your grader first. If resolution is not reached, contact the instructor.

Projects
Students can choose to work alone or with one other group member. Groups will be formed after the first Exam.

Software
List of software that will be used in the course. Software will be provisioned through a virtual lab or available for free trial download
- MySQL, MySQL Workbench
- MongoDB, Studio3T
- Neo4J
- Tableau
- Cisco VPN for off campus connectivity

Policies
Students are expected to attend and participate in lecture discussions, in-class exercises, and group meetings.

Students are responsible for completing individual assignments as well their fair share of team projects by stated deadlines. Assignments turned in late will have 25% of the total points deducted from the graded score for each late day. ***Students are given three "grace" days for the semester (only for Homework and Lab assignmenrts). Other late submissions will be penalized, with no exceptions. Projects do not have grace days.***

For students who add the class after assignments are due, the following policy applies:

- Past due assignments must be completed on an agreed amount time (usually one week).
- A standard deduction of 25% will be applied.

No make-up exams (except for documented medical or family emergencies and religious holy days) will be offered. If they will not be able to attend an exam due to an athletic game or other valid reason, then they must coordinate with the instructor before the exam is given. They may arrange to take the exam before they leave, with an approved university personnel during the time they are gone, or within the week the exam is given. If students do not take an exam, then they will receive a 0 for the exam.

If students need accommodations authorized by OSAS, notify the instructor at least two weeks before the exam. This will allow time for arrangements to be made.

Sharing of course materials outside of the learning environment
SCampus Section 11.12(B)

Distribution or use of notes or recordings based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study is a violation of the USC Student Conduct Code. This includes, but is not limited to, providing materials for distribution by services publishing class notes. This restriction on unauthorized use also applies to all information, which had been distributed to students or in any way had been displayed for use in relationship to the class, whether obtained in class, via email, on the Internet or via any other media. (See Section C.1 Class Notes Policy).

Important Session Dates: (please refer to Registration Calendar
https://classes.usc.edu/term-20241/calendar/ for complete list of important dates)

First day of classes	January 13, 2025
Martin Luther King's Birthday Holiday	January 20, 2025
President's Day Holiday	February 17, 2025
Spring Recess	March 16-23, 2025
Classes End	May 2, 2025
Study Days	May 3-6, 2025
Commencement Week	May 14-17, 2025

Course Schedule: A Weekly Breakdown

	Topics	Lecture	Assignments
Week 1 Jan 13	**The Value of Data** • Explanation of course objectives and tools • Syllabus Review • Discussion of the value and impact of data-driven decision making • Discussion of visual analytics and common presentation strategies • Excel Analytics • Brief history of databases and their role in information systems • Different types of databases and their organizational context • Survey of DBMS	Lecture 1 & 2	

Week 2 Jan 20	**Academic Holiday (Martin Luther King's Birthday)**	No Class	• Lecture 3 - Reading Assignment • Download MySQL Workbench
Week 3 Jan 27	**Foundations of Databases and SQL** • Data Modeling • Data models • Business rules • Relational and entity-relationship modeling • Entities, attributes, relationships • Keys: primary, foreign, candidate, surrogate, super • Minimum and maximum cardinality	Lecture 3	Lab 1 Homework 1
Week 4 Feb 3	**Normalization** • Anomalies and the need for normalization • Normal forms • First, second, third normal forms • Denormalization • Dependency Diagrams	Lecture 4	Lab 2 Homework 2
Week 5 Feb 10	**Introduction to SQL** • Database structures • Introduction to SQL's SELECT statement with WHERE clauses • Query command tools: GROUP BY, HAVING, DISTINCT, COUNT, AND, and OR • Conditional operators: =, !=, >, <, IN, NOT IN, and BETWEEN • Aggregation functions: MIN, MAX, SUM, AVG, and COUNT	Lecture 5 & 6	Lab 3 Homework 3
Week 6 Feb 17	**Academic Holiday (President's Day)**		Read Lecture 8
Week 7 Feb 24	**Combining Data in SQL** • Appending similar data together • Combining data from different tables together • Commands for combining data: JOIN and UNION **Creating Multiple Joins** • Creating relationships between tables: INNER, RIGHT, FULL OUTER, EXCEPTION and CROSS JOINs • Optimizing queries: WHERE, LIMIT and COALESCE	Lecture 6 & 8	Lab 4 Homework 4
Week 8 Mar 3	**Subqueries** • Asking multiple questions in a single query • Nesting queries • Multi-step aggregation or filtering **Mid Term Prep**	• Lecture 9 • Midterm Review • Practice Questions	Homework 5
Week 9 Mar 10	**Exam I**		

Week 10 Mar 11	**Spring Recess (**March 16-23)		
Week 11 Mar 24	**Big Data / Database Trends / NoSQL** • What is Big Data • Database Trends • Drawbacks of SQL • Why NoSQL • Non-relational databases **Introduction to MongoDB** • Data storage • Data Retrieval • Queries		In-class MongoDB exercise
Week 12 Mar 31	**MongoDB Queries** • Queries • Aggregation Framework		Homework 8
Week 13 Apr 7	**MongoDB Queries (Continued)** • Queries • Aggregation Framework **Data Visualization** • Introduction to Charting techniques • Type of variables • Introduction to Tableau Visualization	• Lecture 10 – Data Visualization • Tableau Demo/Exercise	• Tableau Extra Credit • Finalize project teams
Week 14 Apr 14	**Tableau Visualization – Continued.** **Introduction to Graph DBs** • Why graph databases? • Introduction to Neo4J - Modeling	Lecture 14 – Introduction to GraphDB	• Final Project
Week 15 Apr 21	**Working with Neo4J graph databases** • Modeling • Querying	Lecture 15 – Introduction to Cypher Query	
Week 16 Apr 28	**Continue Neo4J graph databases** • Querying • Graph Visualization **Prep for Final Exam**		
Week 17 May 5	**Study Week (**May 3 – May 6)		
Week 18 May 12	**Exam II (May 12, 2024 -> 4:30PM 6:30PM)**		**Final Project Due**

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 Campus 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.

Support Systems:

Counseling and Mental Health - (213) 740-9355 – 24/7 on call
studenthealth.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) 740-9355(WELL), press "0" after hours – 24/7 on call
studenthealth.usc.edu/sexual-assault
Free and confidential therapy services, workshops, and training for situations related to gender-based harm.

Office of Equity and Diversity (OED) - (213) 740-5086 | Title IX – (213) 821-8298
equity.usc.edu, titleix.usc.edu
Information about how to get help or help someone affected by harassment or discrimination, rights of protected classes, reporting options, and additional resources for students, faculty, staff, visitors, and applicants.

Reporting Incidents of Bias or Harassment - (213) 740-5086 or (213) 821-8298
usc-advocate.symplicity.com/care_report
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office of Equity and Diversity |Title IX for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility and Services - (213) 740-0776
osas.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 Campus Support and Intervention - (213) 821-4710
campussupport.usc.edu
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.