USC Iovine and Young Academy
Arts, Technology and the Business of Innovation

IDSN 541 Data Innovation and Analytics

Units:	**4**
Day & Time	**Monday and Wednesday, 6:00 pm – 7:50pm**
Instructor:	**Michael Crowley**
Office:	**crowley@usc.edu**
Office Hours:	**By appointment**

Course Description

This course will introduce students to various sources of data and discuss how to apply various statistical techniques to mine useful information and knowledge. We will also explore utilizing analytics and deploying them across industries to become more strategic and efficient and will emphasize the design aspects of building innovative data applications that are fueled by analytics in the backend.

Prerequisites: None

Recommended Preparation: None

Learning Objectives

By the end of this course, students should be able to:

- Explain how data is converted to knowledge and insights
- Demonstrate good understanding of various statistical techniques applied to data
- Understand various analytics models and their adoption by the various industries
- Deal with data of various types and be able to mine for patterns and insights
- Understand design challenges in incorporating analytics in information/decision systems

Required Software

We will be using the SPSS software for all labs and assignments in this course. Students can obtain a free copy of SPSS from here: https://itservices.usc.edu/stats/spss/. You will need to have SPSS available by Wednesday, the first week of class (8/28).

Required Readings:

[1] Storytelling with Data: A Data Visualization Guide for Business Professionals, by Cole Nussbaumer Knaflic, published 2015 by Wiley

[2] Jeffrey D. Camm, James J. Cochran, et al., Business Analytics, 3rd edition. Published by Cengage Learning, 2018

[3] Jim Frost, Hypothesis Testing: An Intuitive Guide for Making Data Driven Decisions, Published by: Statistics By Jim Publishing, copyright 2020

Grading Breakdown

In-class activities	10%
Labs	50%
Final Project	40%
Total	**100%**

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

A	95-100
A-	90-95
B+	87-90
B	83-87
B-	80-83
C+	77-80
C	73-77
C-	70-73
D+	67-70
D	63-67
D-	60-63
F	Below 60

Course Structure
Students are expected to:
> • Complete weekly labs, assignments, readings, in-class activities, and final project

Students are responsible for completing assigned work by stated deadlines.

Policies
Due dates and requirements for all assigned work will be posted on the course site on Blackboard.

It if the student's responsibility to post work by the due date following the defined class procedures, even if you missclass. Work turned in late will be assessed the following penalties:
- Up to 24 hours late: 20% deduction
- 24 to 48 hours late: 50% deduction
- After 48 hours, zero score.

Academy Attendance Policy

Students remain responsible for any missed work from excused or unexcused absences. Immediately following an absence, students should contact the instructor to obtain missed assignments or lecture notes and to confirm new deadlines or due dates. Extensions or other accommodations are at the discretion of the instructor.

In the case of prolonged illness, family emergencies, or other unforeseen serious issues, the student should contact the instructor to arrange for accommodation. Accommodation may also be made for essential professional or career-related events or opportunities. Additionally, students who need accommodations for religious

observations should provide advanced notice to instructors and student athletes should provide Travel Request Letters. All accommodations remain at the discretion of the instructor, and appropriate documentation may be required.

Unless students provide an accommodation letter from USC's Office of Student Accessibility Services (OSAS) or a letter from IYA Student Services detailing visa or travel restrictions, attendance and active participation is expected in the classroom. Any student with such accommodations should submit their accommodation document to the instructor as soon as possible to discuss appropriate accommodations. Either classroom recordings or live remote access to the class via Zoom will be provided.

Crossover, Synergistic Efforts, and Diversity

This course is a prerequisite to another new course in the Iovine and Young Academy – Transformative AI* in Society. This is part of the Academy's intersectional area expertise that we emphasize.

Course Schedule: A Weekly Breakdown

	Topic/Daily Activities	Readings and Homework	Labs/Assignments (week assigned)
Week 1	Introduction to Class; Introduction to Analytics Methods and Models; Introduction to statistics tool for the course Fundamental Concepts of Hypothesis Testing	Camm et al., Chapter 1 Frost, Chapter 1	Lab 1
Week 2	**Martin Luther King Holiday (no class on Monday)** Descriptive Statistics; Descriptive Data Mining	Camm et al., Chapters 2 and 4	Lab 2
Week 3	Data Visualization 1 T-Test Uses, Assumptions, and Analyses	Knafflic, Chapter 1 Frost, Chapter 2	Lab 3
Week 4	Data Visualization 2 Test Statistics and Their Sampling Distributions	Knafflic, Chapter 2 Frost, Chapter 3	Lab 4
Week 5	Data Visualization 3 Interpreting P-Values	Knafflic, Chapter 3 Frost, Chapter 4	Lab 5
Week 6	**President's Day Holiday (no class on Monday)** Probability: An Introduction to Modeling Uncertainty	Camm et al., Chapter 5	Lab 6
Week 7	Types of Errors and Statistical Power Guest Lecture: Aaron Siegel - Intro to information design/abstraction	Frost, Chapter 5	Lab 7
Week 8	Data Visualization 4 & 5 Linear Regression	Knafflic, Chapters 4 – 6 Camm et al., Chapter 7	Lab 8
Week 9	Data Visualization 6 Time Series Analysis	Knafflic, Chapters 7 and 8 Camm et al., Chapter 8	Lab 9

	Spring Break		
Week 10	One-Tailed and Two-Tailed Hypothesis Tests ; Sample Size Considerations	Frost, Chapters 6 and 7	Final Project Part 1
	Data Types and Hypothesis Tests	Frost Chapter 8	
Week 11	ANOVA Compares More than Two Groups	Frost Chapter 9	
	Continuous Data: Variability, Correlations, Distributions and Outliers	Frost Chapter 10	
Week 12	Binary Data and Testing Proportions	Frost Chapter 11	Final Project Part 2
	Count Data and Rates of Occurrence`	Frost Chapter 12	
Week 13	Categorical Variables	Frost, Chapter 13	
	Alternative Methods	Frost, Chapter 14	
Week 14	Predictive Data Mining	Camm et al., Chapter 9	Final Project Part 3
	Monte Carlo Simulation	Camm et al., Chapter 11	
Week 15	Integer Linear and Nonlinear Optimization Models	Camm et al. Chapters 12 and 13	
	Decision Analysis; Course Evaluations	Camm et al., Chapter 15	
Wednesday, 5/7, 7:00 – 9:00 pm	Final Project Presentations		

Statement on Academic Conduct and Support Systems

Academic Integrity
The University of Southern California is foremost a learning community committed to fostering successful scholars and researchers dedicated to the pursuit of knowledge and the transmission of ideas. Academic misconduct is in contrast to the university's mission to educate students through a broad array of first-rank academic, professional, and extracurricular programs and includes any act of dishonesty in the submission of academic work (either in draft or final form).

This course will follow the expectations for academic integrity as stated in the USC Student Handbook. All students are expected to submit assignments that are original work and prepared specifically for the course/section in this academic term. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s). Students suspected of engaging in academic misconduct will be reported to the Office of Academic Integrity.

Other violations of academic misconduct include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), knowingly assisting others in acts of academic dishonesty, and any act that gains or is intended to gain an unfair academic advantage.

The impact of academic dishonesty is far-reaching and is considered a serious offense against the university and could result in outcomes such as failure on the assignment, failure in the course, suspension, or even expulsion from the university.

For more information about academic integrity see the student handbook or the Office of Academic Integrity's website, and university policies on Research and Scholarship Misconduct.

Please ask your instructor if you are unsure what constitutes unauthorized assistance on an exam or assignment, or what information requires citation and/or attribution.

Policy for the use of AI Generators

AI Generators are not to be used in this course. Using such tools will be considered plagiarism and you will be reported to the Office of Academic Integrity (https://academicintegrity.usc.edu/).

Students and Disability Accommodations:

USC welcomes students with disabilities into all of the University's educational programs. The Office of Student Accessibility Services (OSAS) is responsible for the determination of appropriate accommodations for students who encounter disability-related barriers. Once a student has completed the OSAS process (registration, initial appointment, and submitted documentation) and accommodations are determined to be reasonable and appropriate, a Letter of Accommodation (LOA) will be available to generate for each course. The LOA must be given to each course instructor by the student and followed up with a discussion. This should be done as early in the semester as possible as accommodations are not retroactive. More information can be found at osas.usc.edu. You may contact OSAS at (213) 740-0776 or via email at osasfrontdesk@usc.edu.

Support Systems:

Counseling and Mental Health - *(213) 740-9355 – 24/7 on call*
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention.

988 Suicide and Crisis Lifeline - *988 for both calls and text messages – 24/7 on call*
The 988 Suicide and Crisis Lifeline (formerly known as the National Suicide Prevention Lifeline) provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week, across the United States. The Lifeline is comprised of a national network of over 200 local crisis centers, combining custom local care and resources with national standards and best practices. The new, shorter phone number makes it easier for people to remember and access mental health crisis services (though the previous 1 (800) 273-8255 number will continue to function indefinitely) and represents a continued commitment to those in crisis.

Relationship and Sexual Violence Prevention Services (RSVP) - *(213) 740-9355(WELL) – 24/7 on call*
Free and confidential therapy services, workshops, and training for situations related to gender- and power-based harm (including sexual assault, intimate partner violence, and stalking).

Office for Equity, Equal Opportunity, and Title IX (EEO-TIX) - *(213) 740-5086*
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*
Avenue to report incidents of bias, hate crimes, and microaggressions to the Office for Equity, Equal Opportunity, and Title for appropriate investigation, supportive measures, and response.

The Office of Student Accessibility Services (OSAS) - *(213) 740-0776*
OSAS ensures equal access for students with disabilities through providing academic accommodations and auxiliary aids in accordance with federal laws and university policy.

USC Campus Support and Intervention - *(213) 740-0411*
Assists students and families in resolving complex personal, financial, and academic issues adversely affecting their success as a student.

Diversity, Equity and Inclusion - *(213) 740-2101*
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*
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) 442-1200 – 24/7 on call*
Non-emergency assistance or information.

Office of the Ombuds - *(213) 821-9556 (UPC) / (323-442-0382 (HSC)*
A safe and confidential place to share your USC-related issues with a University Ombuds who will work with you to explore options or paths to manage your concern.

Occupational Therapy Faculty Practice - *(323) 442-2850 or* otfp@med.usc.edu
Confidential Lifestyle Redesign services for USC students to support health promoting habits and routines that enhance quality of life and academic performance.