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

IDSN 499 Introduction to Data Innovation and Analytics

Units:	4
Day & Time	Monday and Wednesday, 5:00 pm – 6:50pm

Instructor:	Michael Crowley
Office:	crowley@usc.edu
Office Hours:	TBD

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 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	40%
Assignments	20%
Final Project	30%
Total	**100%**

Grading Scale
Course final grades will be determined using the following scale.
A   93-100
A-   90-92
B+   88-89
B   83-87
B-   80-82
C+   78-79
C   73-77
C-   70-72
D+   68-69
D   63-67
D-   60-62
F   59 and
           below

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

The Academy maintains rigorous academic standards for its students and on-time attendance at all class meetings is expected. Each student will be allowed two excused absences over the course of the semester for which no explanation is required. Students are admonished to not waste excused absences on non-critical issues, and to use them carefully for illness or other issues that may arise unexpectedly. Except in the case of prolonged illness or other serious issue (see below), no additional absences will be excused. Each unexcused absence will result in the

lowering of the final grade by ⅓ of a grade (e.g., an A will be lowered to A-, and A- will be lowered to a B+, etc.). In addition, being tardy to class will count as one-third of an absence. Three tardies will equal a full course absence.

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.

Automatically excused absences normally may not be used for quiz, exam or presentation days. Using an excused absence for a quiz, exam or presentation, such as in the case of sudden illness or other emergency, is 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.

Fall 2022 addendum:
- 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.
- Students who are experiencing illness should not attend class in person. Please inform the instructor in advance of any class sessions that you can't attend for medical reasons, and accommodations will be arranged to view recorded lectures and submit alternatives to any missed class participation. Students will not be penalized for not attending class in person under these circumstances.
- In the event that you find yourself experiencing COVID-19 related symptoms, in keeping with university recommendations, you should Stay home! This is the best way to prevent spreading COVID-19 as supported by scientific evidence; Please do not come to an in-person class if you are feeling ill, particularly if you are experiencing symptoms of COVID-19.

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 statistic tool for the course; In-class activity Fundamental Concepts of Hypothesis Testing	Camm et al., Chapter 1 Frost, Chapter 1	Lab 1
Week 2	Descriptive Statistics; Descriptive Data Mining; In-class activity T-Test Uses, Assumptions, and Analyses	Camm et al., Chapters 2 and 4 Frost, Chapter 2	Lab 2
Week 3	**No class on Monday – Labor Day** Test Statistics and Their Sampling Distributions	Frost, Chapter 3	Lab 3
Week 4	Data Visualization 1; In-class activity Interpreting P-Values	Knafflic, Chapter 1 Frost, Chapter 4	Lab 4; Assignment 1
Week 5	Time Series Analysis; In-class activity Data Visualization 2	Camm et al., Chapter 8 Knafflic, Chapter 2	Lab 5
Week 6	Types of Error and Statistical Power; In-class activity Data Visualization 3	Frost, Chapter 5 Knafflic, Chapter 3	Lab 6; Assignment 2
Week 7	One-Tailed and Two-Tailed Hypothesis Tests; In-class activity Data Visualization 4	Frost, Chapter 6 Knafflic, Chapter 4	Lab 7
Week 8	Sample Size Considerations; In-class activity Data Types and Hypothesis Tests	Frost, Chapter 7 Frost, Chapter 8	Lab 8; Assignment 3
Week 9	Probability: An Introduction to Modeling Uncertainty; In-class activity Data Visualization 5	Camm et al., Chapter 5 Knafflic, Chapters 5 and 6	Lab 9

Week 10	Continuous Data: Variability, Correlations, Distributions & Outliers; In-class activity Data Visualization 6	Frost, Chapter 10 Knafflic, Chapters 7 and 8	Final Project Part 1
Week 11	Binary Data and Testing Proportions; In-class activity Count Data and Rates of Occurrence	Frost, Chapter 11 Frost, Chapter 12	
Week 12	Linear Regression In-class activity Categorical Variables	Camm et al., Chapter 7 Frost, Chapter 13	Final Project Part 2
Week 13	Alternative Methods; In-class Activity Time Series Analysis and Forecasting	Frost, Chapter 14 Camm et al., Chapter 8	
Week 14	Predictive Data Mining; In-class Activity **Thanksgiving Break – no class on Wednesday**	Camm et al., Chapter 9	Final Project Part 3
Week 15	Linear Optimization Models; In-class Activity Integer Linear Optimization Models	Camm et al., Chapter 12 Camm et al., Chapter 13	

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, http://policy.usc.edu/scientific-misconduct.

Support Systems:
Student Counseling Services (SCS) – (213) 740-7711 – 24/7 on call
Free and confidential mental health treatment for students, including short-term psychotherapy, group counseling, stress fitness workshops, and crisis intervention. engemannshc.usc.edu/counseling

National Suicide Prevention Lifeline – 1 (800) 273-8255
Provides free and confidential emotional support to people in suicidal crisis or emotional distress 24 hours a day, 7 days a week. www.suicidepreventionlifeline.org

Relationship and Sexual Violence Prevention Services (RSVP) – (213) 740-4900 – 24/7 on call
Free and confidential therapy services, workshops, and training for situations related to gender-based harm. engemannshc.usc.edu/rsvp

Sexual Assault Resource Center
For more information about how to get help or help a survivor, rights, reporting options, and additional resources, visit the website: sarc.usc.edu

Office of Equity and Diversity (OED)/Title IX Compliance – (213) 740-5086
Works with faculty, staff, visitors, applicants, and students around issues of protected class. equity.usc.edu

Bias Assessment Response and Support
Incidents of bias, hate crimes and microaggressions need to be reported allowing for appropriate investigation and response. studentaffairs.usc.edu/bias-assessment-response-support

The Office of Disability Services and Programs
Provides certification for students with disabilities and helps arrange relevant accommodations. dsp.usc.edu

Student Support and Advocacy – (213) 821-4710
Assists students and families in resolving complex issues adversely affecting their success as a student EX: personal, financial, and academic. studentaffairs.usc.edu/ssa

Diversity at USC
Information on events, programs and training, the Diversity Task Force (including representatives for each school), chronology, participation, and various resources for students. diversity.usc.edu

USC Emergency Information
Provides safety and other updates, including ways in which instruction will be continued if an officially declared emergency makes travel to campus infeasible. emergency.usc.edu

USC Department of Public Safety – UPC: (213) 740-4321 – HSC: (323) 442-1000 – 24-hour emergency or to report a crime.
Provides overall safety to USC community. [dps.usc.edu](dps.usc.edu)