ISE 543: Enterprise Business Intelligence and Systems Analytics

3 Units
Day/Time: TBA
Location: TBA

Instructor: Bruce Wilcox
Office: GER 203

Office Hours: TBA (in person)
Virtual office hours by appointment

Contact Info: brucewil@usc.edu

Teaching Assistants:
TBA

Catalog Course Description

Overview of data management and analytical techniques used in corporate environments and their practical implementation using a state-of-the-art Business Intelligence software.

Expanded Course Description

Business Intelligence (BI) combines analytics, data mining, data visualization, and statistical methods to enable large organizations to make improved data-driven decisions by extracting important information from complex enterprise systems. Modern BI platforms bring all the components of a project lifecycle from data preparation through discovery and modeling to assessment, deployment, and governance together in a single, integrated environment the requires minimal to no low-level coding ("low-code/no-code").

The primary objectives of this course are to provide the student a theoretical overview of the entire lifecycle of a data science initiative in commercial settings and to provide the opportunity to get experience implementing these techniques using advanced Business Intelligence software currently used by large corporate and public sector entities.

Prerequisite(s): None.

Recommended Preparation: It is recommended that students have an undergraduate-level familiarization with statistics. Previously or concurrently taking ISE-529 and ISE-535 is helpful but not required. While this course will not involve significant amounts of programming, a basic familiarization and comfort with traditional programming languages will be helpful.

Learning Objectives and Outcomes

The overall course objective is to learn the latest technologies and methodologies used in large enterprises to perform a broad range of business intelligence and systems analytics activities.

- The latest generation of business intelligence and analytics software is moving towards a cloud-based "no-code/low-code" data and analytics platform. We will be using leading commercial tools including the Tableau data visualization/dashboard development environment and the Microsoft Azure ML (Machine Learning) cloud-based analytics platform.
- Techniques covered will include data preparation and management, data exploration and reporting/dashboarding, advanced analytical modeling (descriptive and predictive), free text analytics, forecasting, and deployment of analytical products in a large enterprise.
- The course will focus developing an advanced understanding of setting model hyperparameters, interpreting and assessing model results, and deploying and managing data and analytics products in an enterprise environment

Course Overview and Schedule

The course is structured into modules that correspond to many of the components of a typical analytics project. In general, each module will consist of lecture material to introduce (or refresh for the student) the theoretical basis of the technique being covered, a case study with sample data for classroom discussion, and instruction in the use of the corresponding BI software to perform the techniques. Readings will be assigned prior to each module and there will generally be a hands-on assignment.

Course Notes

All course materials (PowerPoints, assigned readings, etc) will be distributed via Blackboard.

Technological Proficiency and Hardware/Software Required

An advanced BI Analytics software platform will be used. The hardware/software required is a laptop or other personal computer and a browser. Accounts will be established for each student and a basic orientation to the software will be provided in the first session with each platform.

Required Readings and Supplementary Materials

There are no mandatory texts for this class. Required readings and supplementary materials will be assigned for each module and distributed via Blackboard and will include the following:

- Mastering Tableau 2021, Meier and Baldwin, 2021, O'Reilly
- Mastering Azure Machine Learning, Korner and Waaijer, 2020, Packt Publishing
- Engineering MLOps, Raj, 2021, Packt Publishing
- A variety of books and other materials published by Microsoft and Tableau
- Selected journal papers of significance in the field of data science

Grading Breakdown

Assignment	% of Grade
Assignments (6)	30
Dashboarding Project	15
Midterm	20
Analytic Modeling Project	15
Final Exam	20

Grading Scale

Course final grades will be determined using the following scale

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

Assignment Submission Policy

Assignments will be posted on Blackboard and submitted for grading on GradeScope (student instructions will be provided)

Assignments turned in after the due date will be penalized 20%. Assignments not turned in within 48 hours of the due date will not be graded.

Our goal is to release grades and feedback within one week of submission.

Course Schedule: A Weekly Breakdown

A detailed course schedule by week with readings, assignments, and specific due will be published prior to the start of the semester and maintained on the class Piazza board. The outline of topics and timelines is summarized below:

- Introduction to topic and tools to be used for the semester (1 week)
- Data visualization and exploration with Tableau desktop (2 weeks)
- Data preparation with Tableau data preparation tools (2 weeks)
- Data analysis with Tableau (1 week)
- Interactive dashboard development with Tableau desktop (2 weeks)
- Mid-term
- Azure ML and modeling pipelines (3 weeks)
    - Azure ML architecture
    - Azure model development tools (Notebook, graphical, auto ML)
    - Building and testing ensemble models and model pipelines
- Azure ML and Model OPS (3 weeks)
    - Infrastructure tools and methodologies for managing the model lifecycle from model development and testing through model deployment and support to model monitoring and upgrades
- Final Exam

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 Campus 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 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 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