

# BUAD 425 - Introduction to Business Analytics

## Syllabus – Spring 2024 – 2 Units

**Professor:** Mladen Kolar

**Office:** BRI 306b

**Email:** mkolar@usc.edu

**Timeline for replying to emails:** within 48 hours

**Office Hours:** over zoom; Wednesday 1-2pm; Thursday 2.30-3.30pm

**Lectures:**

Section	Time	Day
15014R	8-9.50	Wednesday
15011R	10-11.50	Wednesday
15018R	10-11.50	Thursday
15016R	12-1.50	Thursday

**TA:** Yanfei Zhou, [Yanfei.Zhou@marshall.usc.edu](mailto:Yanfei.Zhou@marshall.usc.edu), DSO Statistics PhD student

TA's office hours:

Monday, Wednesday, and Friday: 8:30am - 10:00 am

Tuesday and Thursday: 4:00 pm to 5:30 pm

**USC policies:**

**Academic calendar:** <https://academics.usc.edu/calendar/>

**Registration:** <https://catalogue.usc.edu/content.php?catoid=16&navoid=6095>

**University policies:** <https://catalogue.usc.edu/content.php?catoid=16&navoid=6096>

**Examinations:** <https://catalogue.usc.edu/content.php?catoid=16&navoid=6097>

**Academic standards:** <https://catalogue.usc.edu/content.php?catoid=16&navoid=6098>

**Exception procedures:** <https://catalogue.usc.edu/content.php?catoid=16&navoid=6099>

## Course Description

Over the last two decades, we have witnessed an explosion in the availability of data. Firms routinely collect point of sales transactions, monitor operations throughout their supply-chain, mine website traffic, and track customer engagement. Business analytics and data are transforming modern firms, and, in some cases, disrupting entire industries. Importantly, these changes are not limited to the “back-office” or operations; every aspect of the firm -- organizational structure, marketing, product design, and strategic planning – is shifting towards data-driven decision making. With this shift comes an increased need for “data-savvy” managers; managers who are not necessarily data-science experts, but understand what analytics can and cannot do, how to ask the right questions, and, most importantly, how to interpret data to make better decisions.

The goal of this course is to help you develop your skills as a data-savvy manager. To that end, we will study several basic analytics techniques, focusing on how you, yourself, can apply them in practice, interpret their output, build intuition, and leverage them in decision making. Specifically, we will focus on:

- **AB Testing:** How can we combine data and experimentation to incrementally improve our business model?
- **KPIs and Dashboarding:** How do we convert the ocean of raw data into a manageable insights for decision making? What are the right data to measure and track? How can we communicate that data most effectively to stakeholders?
- **Classification:** Can we utilize historical data to make useful predictions?

- **Clustering:** What hidden structure is in our data? What sorts of insights does that structure give us about our business?

**BUAD 425 is an integrative capstone course that draws on your entire Marshall education:** statistics, finance, marketing, operations, communications, economics and accounting. Our goal is to stress not only that data-driven decision making can be useful in all of these disciplines, but to help you think laterally across these disciplines to solve problems.

## Learning Objectives

At the end of this course, you will be able to:

- I. **Explain** in your own words the key ideas behind fundamental techniques in data analytics, including dashboarding, classification, clustering and AB-testing;
- II. **Identify** new opportunities to use these techniques across business domains to guide decision making;
- III. Confidently **apply** these techniques to novel problems using analytical software;
- IV. **Formulate** and **communicate** actionable business recommendations based upon your analysis, including its limitations;
- V. Critically **assess** the validity of analytics-based recommendations in the context of specific business decisions.

Please see the **Appendix I** for alignment of these goals with the **Marshall Learning Objectives**.

## Required Materials

- Laptop
- Office 365 Excel installed on your laptop (available for free for USC students: <https://itservices.usc.edu/office365/> )
- This class will heavily rely on both Microsoft Excel and more advanced analytical software. Readings, and lecture notes will be distributed throughout the course via BlackBoard.
- **Important:** If you are on campus and would like to access the computer lab, you must have a MyMarshall account, which is provided free of charge to all Marshall students. If you do not have a MyMarshall account or forget your username/password, you can call Help Desk at (213)740-3000. Notice, your MyMarshall account is **DISTINCT** from your USC ID.
- **USC Computing Center Laptop Loaner Program:** <https://itservices.usc.edu/spaces/laptoploaner/>

## Prerequisites

- BUAD 281 (or 305), BUAD 302, BUAD 304, BUAD 306, BUAD 307, BUAD 310/312g and BUAD 311
- BUAD 497 is co-requisite

## Course Notes

We use Blackboard for all assignments, course materials, and announcements. Please check Blackboard and your email daily. If you would like hard copies of any course materials, it will be your responsibility to print them out prior to class.

Working with software is an integral part of this course. Your quizzes and assignments (see below) require using this software. Thus, it is very important that you attend and actively participate in software exercises during class sessions.

Discussing assignments with a partner or study-group is permitted and highly encouraged. Your peers are now and will always be your best resource to learn. **However, each student is required to prepare, write-up, and submit his or her**

own solutions independently, including computer work. Collaboration of any sort on quizzes and exams is prohibited and will result in a zero on that quiz/exam and the appropriate University-level authorities to be notified. See also the Marshall Guidelines on Academic Integrity below.

**Grading Breakdown**

Your course grade is calculated using the following weight scheme:

Assessment Tool (assignments)	% of Grade
Participation 8 Pre-Class assignments (Best 7 out of 8) 4 labs (All 4 count) In-class participation	18%
3 Practice quizzes (All 3 count)	6%
3 Quizzes (Best 2 out of 3)	36%
Final Exam	40%
<b>Total</b>	<b>100%</b>

Grades for the class are expected to average around 3.3 (B+). Letter grades will not be given for individual assignments and exam.

**Description and Assessment of Assignments**

**Preparation for Class: Pre-Class assignments**

Preparation for lectures is a crucial aspect of the learning experience in this course. Your effectiveness in class will largely depend on how well you prepare beforehand. Most classes will be preceded by substantial pre-class assignments, covering a significant portion of the necessary course material. These assignments will typically include videos, readings, and questions that must be completed before each class session. Provided you have engaged with the readings or watched the videos, you will find the questions relatively straightforward. Please refer to the course schedule for details on when these pre-class assignments are due. It is important to note that there are no opportunities for make-up work for these assignments. You will have roughly one week to complete each pre-class assignment. Failure to complete them before the class will result in a score of zero for that assignment. To accommodate unforeseen circumstances, the lowest score from these pre-class assignments will be dropped.

**Disclaimer:** This is not a course in how to use Excel. It is expected that all students have a foundational knowledge and skills in Excel developed in previous Marshall classes (BUAD 310, BUAD 311, etc.). Accordingly, there will be an Excel pre-class assignment that you **must** complete (see Tentative Course Plan below on page 7). There are some reference materials for you to “brush-up” on your Excel skills on blackboard. If you have a lot of difficulty with the Excel pre-class assignment, you may consider dropping BUAD 425 and taking DSO 401 to develop your Excel skills first.

**Your class preparation is assessed mainly on the completion and quality of the answers to pre-class assignments questions.**

**Class Participation**

One of the primary goals of this course is to help you develop the ability both to clarify your own position on an issue and to be able to articulate and defend it clearly. Sharing your perceptions and ideas with others is crucial for learning and for understanding how the diverse opinions that you are likely to encounter in an organization are

debated. You will find yourself presenting and testing new ideas that are not wholly formulated and assisting others in shaping their ideas as well. You should be prepared to take some risks and be supportive of the efforts of others.

Effective class participation consists of analyzing, commenting, questioning, discussing, and building on others' contributions; it is not repeating facts or monopolizing class time. The ability to present one's ideas concisely and persuasively and to respond effectively to the ideas of others is a key business skill. One of the goals of this course is to help you sharpen that ability.

**Your participation is assessed mainly on the completion and quality of your class work, contribution and insights:**

**Outstanding Contribution:**

Your contributions reflect considerable preparation; they are substantive and supported by evidence from the case, readings, and logic. Your comments or questions create a spring-board for discussion by making a critical insight. You synthesize and build upon what has already been said in the discussion. The class learns from you when you speak; in your absence, the discussions would suffer.

**Good Contribution:**

You come prepared with substantiated comments. You demonstrate good insight and clear thinking. You are able to make some connection to what has been said in prior discussion. The class notices when you're not part of the discussion.

**Minimal Contribution:**

You participate but are unprepared. You rarely offer interesting insights into the discussion. It appears that you are not listening to what others are saying during discussion.

**No Contribution:**

You say little or nothing in class. If you were not in the class, the discussion would not suffer.

## **Labs**

The four labs in this course are designed to guide you through four business cases, integrating the material with the broader scope of your Marshall education. These labs provide a vital opportunity for you to utilize and practice the array of tools and knowledge you have accumulated over the past four years. The focus of the case sessions will be on applying analytics techniques to inform the decision-making process, ultimately leading to the formulation of well-reasoned recommendations.

## **Practice Quizzes**

Practice quizzes will help you prepare for in-class quizzes. Practice quizzes will be graded and administered on blackboard. You will have unlimited attempts on the practice quizzes. Only the attempt with highest grade will count.

## **Quizzes**

This course will have three in-class quizzes, each conducted through Blackboard and limited to a duration of one hour. It's important to note that quizzes will be automatically submitted after the one-hour mark. For students who have been granted extra time accommodations by the Office of Student Access Services (OSAS), please make arrangements to take your quiz at the OSAS facility to ensure your accommodations are met.

These quizzes will assess your understanding of the course material available on Blackboard and will require the use of specified analytical software. During the quizzes, internet access and the use of other external resources are not permitted. However, you are allowed to prepare a two-sided sheet of notes for reference.

**Please be aware that no make-up quizzes will be provided.** Each quiz must be taken on its scheduled date and within the section in which you are registered.

**In recognition of the unpredictable nature of life, our quiz policy includes a provision to drop the lowest quiz score. This approach is intended to assist students who might unavoidably miss ONE quiz for reasons such as health emergencies, illnesses, important job interviews, unavoidable travel, significant traffic disruptions, accidental oversight of quiz timings, family emergencies, or other unforeseeable circumstances. Our objective is to ensure fairness and provide reasonable flexibility to all students throughout the semester, accommodating the diverse challenges they might encounter.**

## **Final Exam**

University policy: "For all classes scheduled in a Standard Session a final examination is required during the published final examination week." To that end, a two-hour final examination period is scheduled for all sections of this class

**11:00 AM - 12:30 PM , Saturday, May 4**

**The final exam duration is 1 hour and 30 minutes for all students across all BUAD 425 sections.** For students who have been granted extra time accommodations by the Office of Student Access Services (OSAS), please make arrangements to take your final exam at the OSAS facility to ensure your accommodations are met.

The final exam will be cumulative, and all sections will take it at the same time. Collaboration on exams is strictly prohibited and will result in an "F" grade for the course. Any suspected cheating will be reported to USC for investigation. For more information, please refer to the "Academic Integrity and Conduct" section below. The final exam will be open to course materials on Blackboard and will require the use of analytical software. However, internet access and other resources are not allowed during the exam. Students may prepare up to four two-sided sheets of notes for use during the final exam. No make-up final exams will be offered.

Final Examination Schedule Policy:

ALL INSTRUCTORS MUST ADHERE TO THE OFFICIAL FINAL EXAMINATION SCHEDULE published in the Schedule of Classes ([www.usc.edu/soc](http://www.usc.edu/soc)) for fall and spring semesters. No deviations from the published examination period are permitted for classes scheduled in a standard session during the fall and spring semesters unless authorized in advance by the Committee on Academic Policies and Procedures (CAPP). CAPP will not consider any request for rescheduling final examinations without unanimous written consent of all students in the class. Contact the USC Registrar's Office at (213) 740-4623 or [registrar@usc.edu](mailto:registrar@usc.edu) for a copy of the procedures and the request form. No student is permitted to omit or take in advance a final examination, and no instructor is authorized to permit a student to do so.

Student Scheduling Conflicts:

No student is permitted to omit or anticipate a final examination and no instructor is authorized to permit a student to do so. Students should plan in advance to avoid scheduling conflicts in their final examinations. If a student is scheduled for two final examinations at the same time, the student should request to take one of the examinations on a different day or time. If a student is scheduled for more than two final examinations in one day, the student may request to take one of the exams on a different day or time. In either situation the student must contact the professors involved no later than two weeks prior to the scheduled examination date and request an accommodation. If an accommodation cannot be arranged, the student should contact the USC Testing Services (213-740-7166 or [testing@usc.edu](mailto:testing@usc.edu)) for assistance.

## Religious Observance Conflicts

When a final examination is scheduled at a time that conflicts with a student's observance of a holy day, faculty members should accommodate a request for an alternate examination date and time. **A student must discuss a final examination conflict with the professor no later than two weeks prior to the scheduled examination date to arrange an acceptable alternate examination date and time.** The student and/or professor may reach out to the Office of Religious Life (213-740-6110 or [vasoni@usc.edu](mailto:vasoni@usc.edu), Dean of Religious Life) for guidance.

Alternate or makeup final examinations may not be scheduled after the published examination period for the semester. In case of a documented emergency that prevents the student from completing the course prior to the last day of the semester, the student and faculty member should consider the option of an INcomplete (mark of IN). For more information visit [https://catalogue.usc.edu/content.php?catoid=16&navoid=6098#grades\\_of\\_incomplete\\_\(in\)](https://catalogue.usc.edu/content.php?catoid=16&navoid=6098#grades_of_incomplete_(in)) and get familiar with the Correction of Grade Process <https://arr.usc.edu/faculty-staff/grades/grading-correction-of-grades/>

## Assignment Submission Policy

All assignments must be turned in via Blackboard prior to the due date listed in this syllabus. For pre-class assignments, this is typically before the start of class. Specifically,

- Please plan ahead as the internet might break down unexpectedly if you wait until the last minute.
- Assignments are accepted through **BB ONLY**. Please **DO NOT** email me your assignments.
- **Any assignment turned in late for any reasons except medical emergency, even if by only a few minutes, will NOT be accepted.**

**Late additions to the class should meet with their instructor within TWO weeks of adding the class to make arrangements for completing missed previous work.**

## Grading Timeline

Students can expect grading and feedback from the instructor within a week of submitting an assignment, lab, quiz, or exam.

## Attendance

While class attendance does not directly contribute to your final grade, it is highly encouraged. Active participation in class provides the opportunity to ask questions, clarify difficult or confusing concepts, and engage in discussions with both the instructor and your fellow classmates. This course heavily emphasizes the use of technology for data analysis, and lectures will provide valuable guidance on how to effectively use various analytical software tools. Regular attendance and active engagement will be instrumental in preparing for quizzes and the final exam, as these assessments will be largely based on the application of the technologies covered in class.

## Technology Policy

During most BUAD 425 sessions, access to Blackboard and the use of analytical software is both permitted and required. However, any computer activity unrelated to the ongoing lecture is not allowed. Additionally, the use of personal communication devices, such as cell phones, iPads, and other texting devices, is considered unprofessional and is prohibited during lectures. All electronic devices, including cell phones and iPads, must be completely turned off during class time. If requested, you are expected to comply by placing your device face down on the table in off mode or depositing it in a designated area in the classroom. Please note that videotaping faculty lectures is strictly prohibited due to copyright infringement regulations. Audiotaping may be allowed with the professor's prior approval. Any recorded or distributed material is intended exclusively for the use of USC students registered in this class.

Exceptions to this policy may be granted to individual students on a case-by-case basis with appropriate documentation.

## Open Expression and Respect for All

An important goal of the educational experience at USC Marshall is to be exposed to and discuss diverse, thought-provoking, and sometimes controversial ideas that challenge one's beliefs. In this course we will support the values articulated in the USC Marshall "Open Expression Statement" <https://www.marshall.usc.edu/about/open-expression-statement>

## Technical Support

The Help Desk is available to provide assistance 24 hours a day, every day. This assistance is restricted primarily to problems with the course delivery platform. Contact the Help Desk to resolve problems that you believe are not associated with the hardware and software you have purchased from a vendor. Examples include being unable to view multimedia files or view responses to comments you have posted in the discussion area. If you are not sure whether the problem is due to your computer system, contact the Help Desk for guidance; otherwise, contact the vendor. To talk to a live technical support agent, please call: **877-807-8557** or visit our Support Website <http://usc.echelp.org/>.

## Add/Drop Process

BUAD 425 will remain in open enrollment (R-clearance) for the first three weeks of the term. If there is an open seat, students will be freely able to add a class using Web Registration throughout the first three weeks of the term. If the class is full, students will need to continue checking Web Registration to see if a seat becomes available. There are no wait lists for these courses, and professors cannot add students. An instructor may drop any student who, without prior consent, does not attend the first two sessions; the instructor is not required to notify the student that s/he is being dropped. If you are absent three or more times prior to the end of week 3, your instructor may ask you to withdraw from the class by that date. These policies maintain professionalism and ensure a system that is fair to all students.

## 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](#).

## Artificial Intelligence Usage Policy

Since creating, analytical, and critical thinking skills are part of the learning outcomes of this course, all assignments should be prepared by the student working individually. Students may not have another person or entity complete any substantive portion of the assignment. Developing strong competencies in these areas will prepare you for a competitive workplace. Therefore, **using AI-generated tools is prohibited in this course**, will be identified as plagiarism, and will be reported to the Office of Academic Integrity.

## Course Content Distribution and Synchronous Session Recordings Policies

USC has policies that prohibit recording and distribution of any synchronous and asynchronous course content outside of the learning environment.

Recording a university class without the express permission of the instructor and announcement to the class, or unless conducted pursuant to an Office of Student Accessibility Services (OSAS) accommodation. Recording can inhibit free discussion in the future, and thus infringe on the academic freedom of other students as well as the instructor. (Living our Unifying Values: The USC Student Handbook, page 13).

Distribution or use of notes, recordings, exams, or other intellectual property, based on university classes or lectures without the express permission of the instructor for purposes other than individual or group study. This includes but is not limited to providing materials for distribution by services publishing course materials. 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. (Living our Unifying Values: The USC Student Handbook, page 13).

## Statement on Academic Conduct and Support Systems

### Academic Integrity:

The University of Southern California is a learning community committed to developing successful scholars and researchers dedicated to the pursuit of knowledge and the dissemination of ideas. Academic misconduct, which includes any act of dishonesty in the production or submission of academic work, compromises the integrity of the person who commits the act and can impugn the perceived integrity of the entire university community. It stands in opposition to the university's mission to research, educate, and contribute productively to our community and the world.

All students are expected to submit assignments that represent their own original work, and that have been prepared specifically for the course or section for which they have been submitted. You may not submit work written by others or "recycle" work prepared for other courses without obtaining written permission from the instructor(s).



Other violations of academic integrity include, but are not limited to, cheating, plagiarism, fabrication (e.g., falsifying data), collusion, 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. All incidences of academic misconduct will be reported to the Office of Academic Integrity 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.

## **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](https://osas.usc.edu). You may contact OSAS at (213) 740-0776 or via email at [osasfrontdesk@usc.edu](mailto: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](mailto: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.

## Emergency Preparedness/Course Continuity

In case of a declared emergency if travel to campus is not feasible, the USC Emergency Information web site (<http://emergency.usc.edu/>) will provide safety and other information, including electronic means by which instructors will conduct class using a combination of USC's Blackboard learning management system ([blackboard.usc.edu](http://blackboard.usc.edu)), teleconferencing, and other technologies.

## TENTATIVE COURSE PLAN<sup>1</sup>

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<sup>1</sup> See "Course Outline" below for readings, videos and podcasts for each session. Additional short readings/videos may be assigned via BB throughout the semester.

Week	Section/Date					Lecture	Assignment: due on BB before class
	Mon	Tue	Wed	Thu	Fri		
1	8-Jan	9-Jan	10-Jan	11-Jan	12-Jan	Course introduction. Why study analytics?	Pre-class #1 _ Course intro
2	15-Jan	16-Jan	17-Jan	18-Jan	19-Jan	<b>MLK Day (no class): Excel bootcamp (TA)</b>	<b>Excel bootcamp assignment</b>
3	22-Jan	23-Jan	24-Jan	25-Jan	26-Jan	AB Testing	Pre-class #2 _ AB testing
4	29-Jan	30-Jan	31-Jan	1-Feb	2-Feb	<b>LAB 1: Winning an Election Case</b>	Pre-class #3 _ Election Case
5	5-Feb	6-Feb	7-Feb	8-Feb	9-Feb	<b>Quiz #1: AB testing</b>	<b>Practice quiz #1</b>
6	12-Feb	13-Feb	14-Feb	15-Feb	16-Feb	KPIs, Metrics and Dashboards <b>LAB 2 _ Part (1): Applichem Extension Case</b>	Pre-class #4 _ Applichem Part(1)
7	19-Feb	20-Feb	21-Feb	22-Feb	23-Feb	<b>President's Day (no class): Watch AlphaGo movie</b>	AlphaGO and AI
8	26-Feb	27-Feb	28-Feb	29-Feb	1-Mar	<b>LAB 2 _ Part (2): Applichem Extension Case</b>	Pre-class #5 _ Applichem Part(2)
9	4-Mar	5-Mar	6-Mar	7-Mar	8-Mar	<b>Quiz #2: KPIs, Metrics and Dashboards</b>	<b>Practice quiz #2</b>
10	11-Mar	12-Mar	13-Mar	14-Mar	15-Mar	<b>Spring recess (no class)</b>	
11	18-Mar	19-Mar	20-Mar	21-Mar	22-Mar	Introduction to Classification. Decision Tree	Pre-class #6 _ Decision Tree
12	25-Mar	26-Mar	27-Mar	28-Mar	29-Mar	<b>LAB 3: Trojan Horse Style Case</b>	Pre-class #7 _ Trojan Horse Case
13	1-Apr	2-Apr	3-Apr	4-Apr	5-Apr	<b>Quiz #3: Classification</b>	<b>Practice quiz #3</b>
14	8-Apr	9-Apr	10-Apr	11-Apr	12-Apr	Introduction to clustering, Kmeans clustering	
15	15-Apr	16-Apr	17-Apr	18-Apr	19-Apr	<b>LAB 4: Chow Hound Market Segmentation Case</b>	Pre-class #8 _ Chow Hound Case
16	22-Apr	23-Apr	24-Apr	25-Apr	26-Apr	Final wrap-up	

## Course Outline

**Please check Blackboard for class preparation for each session.**

### **Week 1: Why study analytics?**

We introduce the structure of the class and define business analytics. At the end of this class you will be able to

- Recognize opportunity to apply data analytics in real-world situations
- Describe how this course connects to your previous courses at Marshall
- Explain the value of analytics and your skills to a potential employer

**Week 2: No class. Asynchronous activity: Excel bootcamp conducted by the TA.**

### **Module I: A/B Testing**

#### **Week 3: AB testing.**

We introduce AB testing and experimentation as a means to incrementally improve a business model. At the end of this session you will be able to

- Define AB testing and confounding variables in your own words
- Recognize business opportunities to leverage AB testing
- Use Excel to perform AB tests, and assess for confounding variables
- Critique test design and analyses

## **Week 4: LAB 1: Winning an Election Case**

We use ideas from AB-testing to design and interpret an experiment around creating the most persuasive email campaign to persuade voters to support a particular political candidate. At the end of this session you will be able to:

- Design a simple AB test to assess the effectiveness of an intervention, complete with sample size calculations
- Analyze the results of an AB test in excel and formulate appropriate business recommendations

Readings/Preparation for class

- Video: Pivot Tables Exercise (on BB)
- Winning an Election

## **Week 5: Quiz #1: AB testing**

### **Module II: KPIs, Metrics and Dashboards**

## **Week 6: KPIs, Metrics and Dashboards**

How do we translate raw data into actionable insights? At the end of this session, you will be able to:

- Define a KPI in your own words
- Evaluate the data-requirements of a KPI
- Assess the appropriateness of a KPI for a particular business task
- Construct your own KPIs
- Describe how dashboards are used in management
- Evaluate the quality of a dashboard for a particular business task

Readings/Preparation for class

- Measuring What Matters: How to Pick a Good Metric
  - First 2 pages up to "Qualitative versus Quantitative Metrics"
- What is a Good Performance Metric?
- "Know the difference between your data and your metrics"

## **LAB 2 \_ Part (1): Dashboarding at Applichem**

We will use Excel to create, compute and track KPIs for the Applichem case. At the end of this session, you will be able to

- Use Pivot Tables in Excel to compute KPIs
- Interpret KPIs with respect to the underlying operational issues of a business

Readings/Preparation for class

- Vlookup Video
- Applichem Case

## **Week 7: No class. Asynchronous activity: Watch AlphaGo movie and answer questions on blackboard:**

<https://youtu.be/WXuK6gekU1Y>

## **Week 8: LAB2 \_ Part (2): Dashboarding at Applichem**

We will apply the KPIs developed in LAB2 \_ Part (1) to create a dashboard in Excel. At the end of this session, you will be able to

- Create a simple yet meaningful dashboard
- Use your dashboard to support business decision

Readings/Preparation for class

- A Guide to Creating Dashboards People Love to Use.

## **Week 9: Quiz #2: KPIs/Metrics/Dashboards quiz**

## **Week 10: No class. Spring recess**

## **Module III: Classification**

### **Week 11: Introduction to Classification.**

We introduce the basic idea of classification and measures of accuracy. At the end of this session you will be able to

- Explain the idea of classification in your own words
- Recognize opportunities to use classification in business contexts
- Compute various measures of accuracy of a classifier with Excel
- Build a simple tree model. Explain the key elements in the tree.
- The validation approach.

### **Decision Trees**

At the end of this session you will be able to

- Explain the mathematical foundation of decision trees
- Goodness of fit metrics, stopping criterion.
- Fit a tree model (classifier) using the loan default data
- Interpret the fitted model and evaluate through confusion matrix

### **Week 12: LAB 3: Trojan Horse Style Case**

We use decision trees to create a personalized marketing campaign for a Men's Fashion retailer. At the end of this session, you will be able to

- Create and tune decision-tree classifiers using analytical software
- Interpret the accuracy of a classifier in terms of revenues and costs for a firm
- Formulate and argue for a particular business recommendation based on your analysis
- Critique the analysis of peers

Readings/Preparation for class

- Trojan Horse

## **Week 13: Quiz #3: Classification**

## **Module IV: Clustering**

### **Week 14: Introduction to Clustering, K-Means Clustering**

We introduce the basic ideas behind clustering and describe its business applications. At the end of this session you will be able to

- Explain the intuition behind clustering and prototypical members in your own words
- Recognize opportunities to use clustering in business applications
- Describe the challenges behind defining similarity and choosing the number of clusters

We apply k-means clustering to cluster movies into genres and provide personalized recommendations similar to Netflix.

At the end of this session you will be able to

- Explain the mathematical foundation of K-means clustering
- Apply K-means clustering algorithms
- Interpret the business meaning of the fit and assess the quality of fit

## **Week 15: LAB 4: Chow Hound Market Segmentation Case**

We apply our previous techniques to segment the customer base of an online restaurant delivery service. At the end of this session you will be able to

- Interpret the results of clustering in a business context
- Formulate and argue for a particular business recommendation based on your clustering analysis
- Critique the clustering analysis of peers

Readings/Preparation for class

- Chow Hound Case

## **Week 16: Final Review**

APPENDIX I

How BUAD425 Contributes to Student Achievement of Marshall’s Six Undergraduate Program Learning Goals

Goal	Marshall Program Learning Goal	Course Objectives that support this goal
1	<p><b>Our graduates will demonstrate critical thinking skills so as to become future-oriented decision makers, problem solvers and innovators.</b> Specifically, students will:</p> <p>1.1 Students will understand the concepts of critical thinking, entrepreneurial thinking and creative thinking as drivers of innovative ideas (not explicit for this course).</p> <p>1.2 Critically analyze concepts, theories and processes by stating them in their own words, understanding key components, identifying assumptions, indicating how they are similar to and different from others and translating them to the real world.</p> <p>1.3 Be effective at gathering, storing, and using qualitative and quantitative data and at using analytical tools and frameworks to understand and solve business problems.</p> <p>1.4 Demonstrate the ability to anticipate, identify and solve business problems. They will be able to identify and assess central problems, identify and evaluate potential solutions, and translate a chosen solution to an implementation plan that considers future contingencies.</p>	I, III, IV, V
	<p><b>Our graduates will develop people and leadership skills to promote their effectiveness as business managers and leaders in the 21<sup>st</sup> century’s evolving work and organizational structures.</b> Specifically, students will:</p> <p>2.1 Students will recognize, understand and analyze the roles, responsibilities and behaviors of effective managers and leaders in diverse business contexts e.g., functionally diverse, culturally diverse, geographically diverse, etc.</p> <p>2.2 Students will understand factors that contribute to effective teamwork including how to elicit, manage and leverage diverse perspectives and competencies.</p> <p>2.3 Students will recognize, understand, and analyze the motivations and behaviors of stakeholders inside and outside organizations (e.g., teams, departments, consumers, investors, auditors)</p>	N/A
3	<p><b>Our graduates will be effective communicators to facilitate information flow in organizational, social, and intercultural contexts.</b> Specifically, students will:</p> <p>3.1 Identify and assess diverse personal and organizational communication goals and audience information needs.</p> <p>3.2 Understand individual and group communications patterns and dynamics in organizations and other professional contexts.</p> <p>3.3 Demonstrate an ability to gather and disseminate information and communicate it clearly, logically, and persuasively in professional contexts.</p>	I, IV, V
	<p><b>Our graduates will demonstrate ethical reasoning skills, understand social, civic, and professional responsibilities and aspire to add value to society.</b> Specifically, students will:</p> <p>4.1 Understand professional codes of conduct.</p> <p>4.2 Recognize ethical challenges in business situations and assess appropriate courses of action.</p>	N/A

<p>5</p>	<p><b>Our graduates will develop a global business perspective. They will understand how local, regional, and international markets, and economic, social and cultural issues impact business decisions so as to anticipate new opportunities in any marketplace.</b> Specifically, students will:            5.1 Understand how local, regional and global markets interact and are impacted by economic, social and cultural factors.            5.2 Understand that stakeholders, stakeholder interests, business environments (legal, regulatory, competitor) and business practices vary across regions of the world.</p>	<p>N/A</p>
<p>6</p>	<p><b>Our graduates will understand types of markets and key business areas and their interaction to effectively manage different types of enterprises.</b> Specifically, students will:            6.1 Demonstrate foundational knowledge of core business disciplines, including business analytics and business economics.            6.2 Understand the interrelationships between functional areas of business so as to develop a general perspective on business management.            6.3 Apply theories, models, and frameworks to analyze relevant markets (e.g. product, capital, commodity, factor and labor markets). 6.4 Show the ability to utilize technologies (e.g., spreadsheets, databases, software) relevant to contemporary business practices.</p>	<p>I, II, III, IV</p>