UNIVERSITY OF SOUTH FLORIDA
A PREEMINENT RESEARCH UNIVERSITY

ISM6136:

Data Mining

CRN: 80145, Section 2, 3 Credit Hrs.

COURSE SYLLABUS

Semester: Fall 2023
Class Meeting: BSN 2201, 12:30 pm to 4:15 pm Thursdays
Instructor: Dr. Abdallah Musmar
Office Location: CIS 2085B
Office Hours: By appointment
Email: musmar@usf.edu

I.   Welcome Data Mining (for Business)!
In this course you will learn both tools and techniques to describe large sets of data, diagnose why certain outcomes may have happened, and analyze the possibility of future outcomes. The skills you will learn in this course will help you gain competitive advantage in a modern business management environment. You will be better able to visualize, describe and understand what has occurred within the business through analysis of data. You will also learn techniques to diagnose how certain outcomes may have been seen, and support decisions moving forward based on predictions of future outcomes.

II.   University Course Description
This course is designed for the MS in Information Systems graduate student and interested MBA students. The course covers the rapidly evolving data mining techniques that are becoming critical for customer relationship management and other applications.

III.   Course Prerequisites
Currently registered in MS BAIS

IV.   Course Format
Live classroom format.

V.   Student Learning Outcomes
- Demonstrate understanding of specific data mining methods
- Describe different ways in which models can be evaluated
- Use data mining tools to build descriptive and predictive models
- Analyze a dataset using data analytics methods
- Describe global business scenarios where data and data mining can be applied

More specific module-specific learning outcomes are noted further below.

VI.   **Required Texts and/or Readings and Course Materials**
- No required textbook.
- Online links to readings and/or courses will supplement the custom course content.
- Data Mining Software: We will use Jupyter Notebooks for analyzing and mining our data. This software is free. The installation and setup of this software will be covered in the first week. Unless you are already familiar with Jupyter Notebooks, it's recommended that you wait until the instructions are provided.

VII.   **Supplementary (Optional) Texts and Materials**
Supplementary material may be offered as part of the weekly set of readings.

VIII.   **How to Succeed in this Course**
It's important that you properly pace yourself. Understanding this material well will require practice, reflection in thinking. Be sure to schedule study time frequently. Do not leave the review of material for the day of an assignment or test. In each week, begin by responding to any assigned discussion board questions (and engage with other students in the content – I'll expect at least one reply to another students post). Then complete any assigned readings and watch any assigned videos. Attending class is also critical to your success, as some course material may only be discussed in class.

IX.   **Academic Continuity**
During any semester, there is a possibility the course may be disrupted, whether due to continued pandemic or hurricane season. Inform students of your plan should the university transition to remote instruction. Will you require attendance via live, synchronous sessions using Microsoft Teams? Note where links will be made available in the Canvas section. Or you may elect to use asynchronous resources, activities and assignments, in which case you can share where students will be able to find these items in Canvas. Note, this may require additional technology than the regularly used in the course.

X.   **Communication**
This class is assisted by Canvas. Make sure to check your Canvas and your USF email account daily.

General Communication Guidelines:
1. Act professionally in the way you communicate. Treat your instructors and peers with respect, the same way you would do on a face-to-face environment. Respect other people's ideas and be constructive when explaining your views about points you may not agree with.
2. Be sensitive. Be respectful and sensitive when sharing your ideas and opinions. There will be people in your class with different linguistic backgrounds, political and religious beliefs or other general differences.
3. Proofread and check spelling. Doing this before sending an email or posting a thread on a discussion board will allow you to make sure your message is clear and thoughtful. Avoid the use of all capital letters, it can be perceived as if you are shouting, and it is more difficult to read.
4. Keep your communications focused and stay on topic. Complete your ideas before changing the subject. By keeping the message on focus you allow the readers to easily get your idea or answers they are looking for.
5. Be clear with your message. Avoid using humor or sarcasm. Since people can't see your expressions or hear your tone of voice, meaning can be misinterpreted.

Email and Discussion Board Guidelines:
1. Use the subject line effectively by using a meaningful line of what your email or discussion is about.
2. Keep your emails and postings related to the course content. You should not post anything personal on a discussion board, unless is requested by the instructor.
3. Any personal, course or confidential issues should be directly communicated to the instructor via email. The discussion boards are public spaces; therefore, any issues should not be posted there.

XI.   Grading Scale

Grading Scale (%)

94 – 100	A	74 – 76	C
90 – 93	A-	70 – 73	C-
87 – 89	B+	67 – 69	D+
84 – 86	B	64 – 66	D
80 – 83	B-	60 – 63	D-
77 – 79	C+	0 – 59	F

XII.   Grade Categories and Weights

Graded Items	Percent of Final Grade
Assignments	20%
Quizzes	20%
Course Project	20%
Discussion Forum	10%
Final Exam	30%

Assignments: Homework assignments are to be completed individually by each student. The primary purpose of these assignments is for students to have the opportunity to practice the concepts learned in class, and to implement them using real data and real software.

Online Discussion: Our online discussion will be facilitated via Canvas. The discussion will focus on high-level aspects of analytics and data mining. Your mark will be determined by the quality of your posting, and indication that you've engaged in the discussion (at least one reply adding to a classmate posting).

Course Project: The course project will be a group project. Details for the project are provided in Week 9.

Quizzes: There will be several brief multiple-choice quizzes assigned in various classes.

Final Exam: The final exam will consist of a multiple-choice portion and a problem portion.

XIII.   Instructor Feedback Policy & Grade Dissemination
Grading of any submitted work will be completed within 4 days. You will find you grades and associated feedback on Canvas.

XIV. Course Schedule.

Class	Topics	Assignments
Week 1	- Course introduction - Syllabus overview - Business Analytics/Data Mining Introduction - Introduction to Python environment	• Discussion 01 Posting
Week 2	- Python concepts for business analytics - The 'Curse of Dimensionality' - Generalized modeling process - Examples using Linear and Polynomial OLS modelling.	• Discussion 02 Posting
Week 3	- Data & Data preprocessing - Data Visualization - Multivariable Regression	• Discussion 03 Posting • Assignment 01 – Data importing and visualization & multivariable regression
Week 4	- Confusion Matrices and Metrics - K-Nearest Neighbors - Data Imbalance	• Discussion 04 Posting • Assignment 02 – Application of K-NN
Week 5	- Setting cut-off values - Decision Trees	• Discussion 05 Posting • Assignment 03
Week 6	- Ensemble Modeling - Hyper Parameter Tuning - More on evaluation	• Discussion 06 Posting • Assignment 04
Week 7	- Logistic Regression	• Discussion 07 Posting • Assignment 05
Week 8	- Neural Networks	• Discussion 08 Posting • Assignment 06
Week 9	- Probabilistic Modeling	• Discussion 09 Posting • Assignment 07
Week 10	- Catch-up Day	• Discussion 10 Posting • Assignment 08 – To Be Determined
Week 11	- Group Presentations	
Week 12	- Final Exam	

* Note: The Schedule is subject to revision

XV. USF Core Syllabus Policies

USF has a set of central policies related to student recording class sessions, academic integrity and grievances, student accessibility services, academic disruption, religious observances, academic continuity, food insecurity, and sexual harassment that **apply to all courses at USF**. Be sure to review these online at: https://www.usf.edu/provost/faculty/core-syllabus-policy-statements.aspx

XVI. Course Policies: Grades

Late Work Policy: Offer specifics about your policy on late work.

This is a short and fast-moving course. Start any assignments early and do not wait for your submission until the last minute of the deadline as there is always a chance that you might encounter network or hardware issues.

NO LATE SUBMISSIONS WILL BE ACCEPTED. IF YOU MISS A DEADLINE, YOU WILL BE AUTOMATICALLY ASSIGNED A SCORE OF ZERO FOR THE DELIVERABLE.

Grades of "Incomplete":

The current university policy concerning incomplete grades will be followed in this course. <u>For undergraduate courses:</u> An "I" grade may be awarded to a student only when a small portion of the student's work is incomplete and only when the student is otherwise earning a passing grade. The time limit for removing the "I" is to be set by the instructor of the course. For undergraduate students, this time limit may not exceed two academic semesters, whether or not the student is in residence, and/or graduation, whichever comes first. For graduate students, this time limit may not exceed one academic semester. "I" grades not removed by the end of the time limit will be changed to "IF" or "IU," whichever is appropriate.

<u>For graduate courses:</u> An Incomplete grade ("I") is exceptional and granted at the instructor's discretion only when students are unable to complete course requirements due to illness or other circumstances beyond their control. The course instructor and student must complete and sign the "I" Grade Contract Form that describes the work to be completed, the date it is due, and the grade the student would earn factoring in a zero for all incomplete assignments. The due date can be negotiated and extended by student/instructor as long as it does not exceed two semesters for undergraduate courses and one semester for graduate courses from the original date grades were due for that course. An "I" grade not cleared within the two semesters for undergraduate courses and one semester for graduate courses (including summer semester) will revert to the grade noted on the contract.

Attendance Policy:

Students are expected to attend classes. Excused absences may be accommodated by making arrangements with the professor well ahead of time (when possible).

Campus Free Expression:

It is fundamental to the University of South Florida's mission to support an environment where divergent ideas, theories, and philosophies can be openly exchanged and critically evaluated. Consistent with these principles, this course may involve discussion of ideas that you find uncomfortable, disagreeable, or even offensive.

In the instructional setting, ideas are intended to be presented in an objective manner and not as an endorsement of what you should personally believe. Objective means that the idea(s) presented can be tested by critical peer review and rigorous debate, and that the idea(s) is supported by credible research.

Not all ideas can be supported by objective methods or criteria. Regardless, you may decide that certain ideas are worthy of your personal belief. In this course, however, you may be asked to engage with complex ideas and to demonstrate an understanding of the ideas. Understanding an idea does not mean that you are required to believe it or agree with it.

Make-up Exams Policy:

If a student cannot be present for an examination for a valid reason (validity to be determined by the instructor), a make-up exam will be given only if the student has notified the instructor in advance that s/he cannot be present for the exam. Make-up exams are given at the convenience of the instructor usually on Fridays at 10 am.

Group Work Policy:

Everyone must take part in a group project. All members of a group will receive the same score; that is, the project is assessed, and everyone receives this score. However, that number is only 90% of your grade for this project. The final 10% is individual and refers to your teamwork. Every person in the group will provide the instructor with a suggested grade for every other member of the group, and the instructor will assign a grade that is informed by those suggestions.

Final Examinations Policy: All final exams are to be scheduled in accordance with the University's final examination policy.

WhatsApp, GroupMe, and Student-to-Student Communication: While students may use digital communication tools (WhatsApp, GroupMe, etc.) to communicate with fellow students, it is important to remember that academic integrity policies still apply in these environments. Informing others about the contents of tests is prohibited by the official regulation, as is receiving unauthorized information about an examination. Students are expected and required to immediately report instances of such violations to the instructor.

XVII. Course Policies: Student Expectations

Title IX Policy: Title IX provides federal protections for discrimination based on sex, which includes discrimination based on pregnancy, sexual harassment, and interpersonal violence. In an effort to provide support and equal access, **USF has designated all faculty (TA, Adjunct, etc.) as Responsible Employees, who are required to report any disclosures of sexual harassment, sexual violence, relationship violence or stalking.** The Title IX Office makes every effort, when safe to do so, to reach out and provide resources and accommodations, and to discuss possible options for resolution. Anyone wishing to make a Title IX report or seeking accommodations may do so online, in person, via phone, or email to the Title IX Office. For information about Title IX or for a full list of resources please visit: https://www.usf.edu/title-ix/gethelp/resources.aspx. *If you are unsure what to do, please contact Victim Advocacy – a confidential resource that can review all your options – at 813-974-5756 or va@admin.usf.edu.*

Course Hero / Chegg Policy (and other similar): The USF Policy on Academic Integrity specifies that students may not use websites that enable cheating, such as by uploading or downloading material for this purpose. This does apply specifically to Chegg.com and CourseHero.com – almost any use of these websites (including uploading proprietary materials) constitutes a violation of the academic integrity policy.

Professionalism Policy: Per university policy and classroom etiquette; mobile phones, iPods, etc. **must be silenced** during all classroom and lab lectures. Those not heeding this rule will be asked to leave the classroom/lab immediately so as to not disrupt the learning environment. Please arrive on time for all class meetings. Students who habitually disturb the class by talking, arriving late, etc., and have been warned may suffer a reduction in their final class grade.

End of Semester Student Evaluations: All classes at USF make use of an online system for students to provide feedback to the University regarding the course. These surveys will be made available at the end of the semester, and the University will notify you by email when the response window opens. Your participation is highly encouraged and valued.

Turnitin.com: *In this course, turnitin.com will be utilized. Turnitin is an automated system which instructors may use to quickly and easily compare each student's assignment with billions of web sites, as well as an enormous database of student papers that grows with each submission. Accordingly, you will be expected to submit all assignments in both hard copy and electronic format. After the assignment is processed, as instructor I receive a report from turnitin.com that states if and how another author's work was used in the assignment. For a more detailed look at this process visit* http://www.turnitin.com*. Essays are due at turnitin.com the same day as in class.*

Netiquette Guidelines
1. Act professionally in the way you communicate. Treat your instructors and peers with respect, the same way you would do in a face-to-face environment. Respect other people's ideas and be constructive when explaining your views about points you may not agree with.
2. Be sensitive. Be respectful and sensitive when sharing your ideas and opinions. There will be people in your class with different linguistic backgrounds, political and religious beliefs or other general differences.
3. Proofread and check spelling. Doing this before sending an email or posting a thread on a discussion board will allow you to make sure your message is clear and thoughtful. Avoid the use of all capital letters, it can be perceived as if you are shouting, and it is more difficult to read.
4. Keep your communications focused and stay on topic. Complete your ideas before changing the subject. By keeping the message on focus you allow the readers to easily get your idea or answers they are looking for.
5. Be clear with your message. Avoid using humor or sarcasm. Since people can't see your expressions or hear your tone of voice, meaning can be misinterpreted.

XVIII. Learning Support and Campus Offices
Academic Accommodations
Students with disabilities are responsible for registering with Student Accessibility Services (SAS) in order to receive academic accommodations. For additional information about academic accommodations and resources, you can visit the SAS website.
SAS website for the Tampa and Sarasota-Manatee campuses.
SAS website for the St. Pete campus.

Academic Support Services
The USF Office of Student Success coordinates and promotes university-wide efforts to enhance undergraduate and graduate student success. For a comprehensive list of academic support services available to all USF students, please visit the Office of Student Success website.

Canvas Technical Support
Include information where students can find technical support.

If you have technical difficulties in Canvas, you can find access to the Canvas guides and video resources in the "Canvas Help" page on the homepage of your Canvas course. You can also contact the help desk by calling 813-974-1222 in Tampa or emailing [help@usf.edu.](mailto:help@usf.edu)
[IT website for the Tampa campus.](#)
[IT website for the St. Pete campus.](#)
[IT website for the Sarasota-Manatee campus.](#)

Center for Victim Advocacy
The [Center for Victim Advocacy](#) empowers survivors of crime, violence, or abuse by promoting the restoration of decision making, by advocating for their rights, and by offering support and resources. Contact information is available online.

Counseling Center
The Counseling Center promotes the wellbeing of the campus community by providing culturally sensitive counseling, consultation, prevention, and training that enhances student academic and personal success. Contact information is available online.
[Counseling Center website for the Tampa campus.](#)
[Counseling Center website for the St. Pete campus.](#)
[Counseling Center website for the Sarasota-Manatee campus.](#)

Writing Studio
The Writing Studio is a free resource for USF undergraduate and graduate students. At the Writing Studio, a trained writing consultant will work individually with you, at any point in the writing process from brainstorming to editing. Appointments are recommended, but not required. For more information or to make an appointment, email: writingstudio@usf.edu.
[Writing studio website for the Tampa campus.](#)
[Writing studio website for the St. Pete campus.](#)
[Writing studio website for the Sarasota-Manatee campus.](#)

XIX. Important Dates to Remember

For important USF dates, see the [Academic Calendar](#) at http://www.usf.edu/registrar/calendars/