Syllabus: Course INFSYS 3862/6862

Artificial Intelligence Applications for Business

About this course:

There is no required text-book

Considerable material in the form of notes, videos, PowerPoint slides, and web links will be assigned and available through Canvas.

Optional Books:

If interested, check out the books below:

Title: The Quest for AI: A History of Ideas and Achievements
Author: Nils Nilsson
Publisher: Cambridge University Press
Year: 2009

Title: Python for Finance, 2nd Edition
Author: Yves Hilpisch
Publisher: O'Reilly Media, Inc.
Year: 2018

Title: Applied Artificial Intelligence: A Handbook for Business Leaders
Author: Mariya Yao, Adelyn Zhou, Marlene Jia
Publisher: Topbots
Year: 2018

Title: Fraud Analytics Using Descriptive, Predictive, and Social Network Techniques: A Guide to Data Science for Fraud Detection
Author: Bart Baesen, Veronique Van Vlasselaer, Wouter Verbeke
Publisher: Wiley
Year: 2015

Course Description

Bulletin Description:

INFSYS 3862 Artificial Intelligence Applications for Business: 3 semester hours

Prerequisites: INFSYS 3830 (Links to an external site.) or consent of instructor. This course introduces students to topics in Artificial Intelligence (AI) and its applications in Business and Cybersecurity. The course discusses the history of AI and delves into Machine Learning (ML) and its general methodology of development of data models. The course provides a sampling of successful applications of AI and ML in

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different areas of Business such as portfolio management, algorithmic trading, fraud analytics, and credit scoring.

Credit cannot be granted for both INFSYS 3862 (Links to an external site.) and INFSYS 6862.

INFSYS 6862 Artificial Intelligence Applications for Business and Cybersecurity: 3 semester hours

Prerequisite: Graduate standing. This course introduces students to topics in artificial intelligence (AI) and its applications in business and cybersecurity. The course starts with a historical development of fundamental ideas in AI and their relationship to the state of the art. The course then introduces one of the most successful branches of AI- machine learning (ML), and its general methodology of the development of data models. The course provides a sampling of successful applications of AI and ML in different areas of business such as portfolio management, algorithmic trading, fraud analytics, and credit scoring. Credit cannot be granted for both INFSYS 3862 (Links to an external site.) and INFSYS 6862 (Links to an external site.).

Student background:

A background in programming (preferably in Python) is required. Since Python programming language is widely used in AI, the course will introduce you to basic programming idioms from Python.

Broad Learning Outcomes:

After completing this course, student should be able to:

- Identify the latest AI technologies within the conceptual framework of AI as viewed by practitioners and researchers
- Understand the role of AI in the larger context of an enterprise
- Develop predictive data models using machine learning
- Predict the direction of stocks using financial data models
- Predict customer churn and lifetime value
- Develop data models for fraud and intrusion detection
- Perform demand forecasting for supply chain management

Course Topics:

The following topics will be covered:

- Introduction to AI
  - Approaches to AI
  - Branches of AI
  - Waves of AI - Historical Progress
  - Myths about AI

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        - Role of AI in Business
    - Intro to Python
        - Data types in Python

        - Lists and Tuples
        - Dictionaries and Sets
        - Functions and Objects
        - Basics of Numpy and Pandas
        - Basics of Scikit-Learn
        - Google Colab programming environment
    - Machine Learning in Python
        - Discover and Visualize the Data
        - Data Preparation
        - Select and Train the Model
        - Fine-tuning the Model
        - Commonly used learning algorithms
    - Applications in Finance
        - Basics of Corporate Finance
        - Stock direction prediction
        - Calculating Beta of a stock
        - Fama-French model
    - Applications in Marketing
        - Churn Prediction
        - Customer Lifetime Value
        - Customer Segmentation
    - Applications in Cybersecurity
        - Fraud detection
        - Intrusion detection
    - Applications in Supply Chain
        - Demand Forecasting

How to Succeed in This Course

This online course is divided into "modules". Each module will have reading material, lecture videos, lecture slides, and assignments. The assignments will either be in the form of a quiz, discussion, programming assignment, or a written assignment you upload to Canvas.

- Each module is designed to be completed in two weeks. It is best that you pace yourself and try to complete the modules within that time.
- If this course were offered on campus, you'd be in class 2.5 hours/week plus travel time. The online version is no different in terms of expectations for your involvement. This is an active online course that requires 3 hours of your time each week **in addition to** the time it takes you to read the required materials, watch the videos, and complete the assignments. That means

that you need to plan to spend a minimum of **6 hours every week** (up to 9-10 hours a week) on activities related to this course. If you are worried about your preparedness, consider taking the Online Readiness Survey (Links to an external site.) to help decide if an online course is right for you.

- If something is not clear please contact the instructor.
- **If this is your first online course, I recommend you complete the Online Course Overview listed in your Canvas course list.** If you've already completed the orientation, you do not have to retake it but you can refer to it for helpful videos and tutorials about the technologies used in this course.

Assessment/Grading

Grading Components:

Students are expected to demonstrate learning by participating in discussions, completing assignments, and taking quizzes. There will be one final comprehensive exam. In addition to these, graduate students are required to work on individual term papers. Thus, your grade will be calculated as follows:

Course Component	**Weight - Undergraduate Students**	**Weight - Graduate Students**
Quiz/Assignment	60%	60%
Final Exam	30%	15%
Individual Research Papers (*Graduate Students only*)	n/a	15%
Discussion and Engagement	10%	10%
Maximum Possible Final Score:	**100%**	**100%**

***Grading Scale*:**

Letter grades will not be assigned to individual components of the course. Only points (numeric scores) will be assigned. These scores will be combined into a Final Score (a Weighted Total) out of 100, rounded to one decimal place. Depending on this final score, your overall letter grade for this course will be determined as follows.

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Final score ranges and corresponding letter grades			
>=94	A	70-73.9	C
90-93.9	A-	66-69.9	C-
86-89.9	B+	62-65.9	D+
82-85.9	B	58-61.9	D
78-81.9	B-	54-57.9	D-
74-77.9	C+	<54	F (fail)

Grading Scale: The UMSL Grading System is based on a four-point scale. The grade value for each letter grade (shown in table above) is available here: http://bulletin.umsl.edu/undergraduatestudy/#gradingtext (Links to an external site.). At the same link, please also see the policies for, EX = Excused, DL = Delayed, and FN = Failure/Non Participation grade assignments.

Feedback and Grading Timeline:
Most quizzes should provide immediate feedback and scores. You can find your scores from the Grades button in this course on Canvas. Other assignments may take longer to grade but I will make every attempt to return scores within 10 days of assignment due date. If there is a rubric attached to the assignment, you can click your score to see my personal feedback on the rubric.

Course Policies

Course Work:

1. I expect students to complete all readings and other work as per schedule.
2. Assignment/Quiz submission deadlines will be clearly stated. Late submissions will receive deductions of 10% for each 24 hour period after the due date until no points remain. I will consider exceptions only when a student has provided an acceptable reason (e.g., family/health emergency, unavoidable work related travel).
3. I will make announcements on Canvas. I strongly encourage you to visit this course under Canvas regularly for important updates and documents.
4. Please check your UMSL email account regularly for information/updates regarding this course.

Academic Integrity/Plagiarism

- You are responsible for being attentive to and observant of University policies about academic honesty as stated in the University's Campus Policies and Code of Student Conduct found in the UMSL Bulletin

- Academic dishonesty is a serious offense that may lead to probation, suspension, or dismissal from the University. One form of academic dishonesty is plagiarism – the use of an author's ideas, statements, or approaches without crediting the source. Academic dishonesty also includes such acts as cheating by using any unauthorized sources of information and providing or receiving unauthorized assistance on any form of academic work or engaging in any behavior specifically prohibited by the faculty member (e.g., copying someone else's answers on tests and quizzes). Unauthorized possession or distribution of academic materials is another type of academic misconduct. It includes the unauthorized use, selling or purchasing of examinations or other academic work, using or stealing another student's work, unauthorized entry or use of material in a computer file, and using information from or possessing exams that an instructor did not authorize for release to students. Falsification is any untruth, either verbal or written, in one's academic work. Facilitation is knowingly assisting another to commit an act of academic misconduct. **Plagiarism, cheating, and falsification are not acceptable.**
- All instances of academic dishonesty will be reported to the Office of Academic Affairs who will determine whether you will appear before the Student Conduct Committee for possible administrative sanctions such as dismissal from the university. The instructor will make an academic judgment about the student's grade on that work in this course. The campus process regarding academic dishonesty is described in the "Policies" section of the Academic Affairs website.
- *Follow the AMA style for your reports.*
- Plagiarism is the use of another person's words or ideas without crediting that person.
- Plagiarism and cheating will not be tolerated and may lead to failure on an assignment, in the
  class, and dismissal from the University, per the UMSL academic dishonesty policy.
- Students are responsible for being attentive to and observant of campus policies about academic honesty as stated in the University's Student Conduct Code.
- To avoid accusations of academic dishonesty, please submit all written work to the Turnitin System before finalizing what you submit for evaluation. Check information about The Writing Center on UMSL's website.

Title IX Policies

In adherence to the policies of Title IX and to promote a safe and secure educational environment, it is strongly recommended statements similar to those below be added to your course syllabus:

- **Mandatory Reporting:** Under Title IX, all UMSL faculty, staff, and administrators (with limited exception) are obligated to report any incidents of sexual harassment, sexual misconduct, sexual assault, or gender discrimination to the Student Affairs office and/or other University officials. This ensures that all parties are protected from further abuses and that victim(s) are supported by trained counselors and professionals. Note: There are several offices at UMSL (e.g., Counseling Services, Health Services, Community Psychological Service, Center for Trauma Recovery, and Student Social Services) whose

staff are exempt from Title IX mandated reporting, when the information is learned in the course of a confidential communication.

- **Content Advisory:** The course requires good logical skills and knowledge of materials from the pre-requisite courses. Some of the concepts require abstract thinking and ability of apply college level algebra.

Student Resources

Access, Disability and Communication

Your academic success is important. If you have a documented disability that may have an impact upon your work in this class, please contact Disability Access Services (DAS) immediately. Students must provide documentation of their disability to the office of Disability Access Services in order to receive official University services and accommodations. The staff is available to answer questions regarding accommodations or assist you in your pursuit of accommodations. Information about your disability is confidential. Once DAS reviews your medical documentation, they will provide you with the information and steps to inform me about the accommodations to which you are entitled. Your accommodations will begin as soon as we discuss your approved accommodations.

- 144 Millennium Student Center (MSC)
- Phone: (314) 516-6554
- Email: Tara Cramer, cramert@umsl.edu
- Website: http://www.umsl.edu/services/disability/

Office of International Students and Scholar Services

If you have difficulty communicating in English with the instructor of this course, contact ISS.

- 362 Social Sciences & Business Building (SSB)
- Phone: (314) 516-5229
- Email: iss@umsl.edu
- Website: http://www.umsl.edu/~intelstu/contact.html

Student Enrichment and Achievement

SEA provides comprehensive support and intervention strategies that support your road to graduation!

- 107 Lucas Hall
- Phone: (314) 516-5300
- Email: umslsea@umsl.edu
- Website: https://www.umsl.edu/services/sea/

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Office of Multicultural Student Services (MSS) and the University Tutoring Center (UTC)

MSS provides comprehensive student retention services to diverse student populations; through their tutoring center, the MSS offers comprehensive tutoring services free to students at UMSL.

- 225 Millennium Student Center (MSC)
- Phone: (314) 516-6807
- Email: multicultural@umsl.edu
- Website: https://www.umsl.edu/~mcraa/index.html

More Student Resources are on the Learning Resource Lab website.

Technical Support

Canvas

If you have problems logging into your online course, or an issue within the course site, please contact the

Technology Support Center:

- Phone: (314) 516-6034
- Email: helpdesk@umsl.edu
- Website : http://www.umsl.edu/technology/tsc/

If you are having difficulty with a technology tool in Canvas, consider visiting the Canvas Student Guides, which has overviews of each tool and tutorials on how to use them.

If you continue to experience problems or just have questions, you can also contact the

Learning Resource Lab:

- Phone: (314) 516-6704
- Email: lrl@umsl.edu
- Website: http://www.umsl.edu/technology/lrl/

VoiceThread

- Online Contact Form: https://voicethread.com/support/contact/
- Website: https://voicethread.com/howto/

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Academic Support

Math Academic Center (Math Lab)
The Math Academic Center offers free individual assistance on a walk-in basis to students needing help with any mathematics from basic math through calculus or any course involving mathematical skills.

- 222 Social Sciences and Business Building (SSB)
- Website: http://www.umsl.edu/mathcs/math-academic-center/

Other Support Services:

A variety of academic, non-academic, and technical support services are available on campus. Please visit Student Resources (Links to an external site.) to get information.