



Odette School
of Business
University of Windsor

BSMM-8740: Data Analytic Methods & Algorithms Master of Management Summer 2023

Class section	001		
Class meetings	Tuesday and Friday, 8 AM to 10 AM		
Instructor	Dr. Ali El-Sharif		
Office hours	Tuesday and Friday, 10 AM to 11 AM	Office	Microsoft Teams
Telephone	Microsoft Teams	E-mail	elsharif@uwindsor.ca
Course Website	https://brightspace.uwindsor.ca		
Textbook	The Elements of Statistical Learning - Data Mining, Inference, and Prediction. Second Edition by Trevor Hastie, Robert Tibshirani, and Jerome Friedman. Available for free at https://web.stanford.edu/~hastie/ElemStatLearn/		
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The Odette School of Business and the University of Windsor sit on the Traditional territory of the Three Fires confederacy of First Nations, comprised of the Ojibway, the Odawa, and the Potawatomie.

CALENDAR DESCRIPTION:

This course is the exploration of an analytical framework for method selection and model building to help students develop professional capability in data-based techniques of data analytics. A focus will be placed on comparing and selecting appropriate methodology to conduct advanced statistical analysis and on building predictive modeling in order to create a competitive advantage in business operations with efficient analytical methods and data modeling.

LEARNING OBJECTIVES:

The general objectives of this course are to:

- Describe the concepts and issues associated with analytical framework for method selection and model building
- Describe the assumptions, limitations, and advantages of various statistical techniques for building predictive models
- Develop an understanding of various data analytics algorithms
- Demonstrate a capacity for interpersonal interactions

MASTER OF MANAGEMENT COMPETENCIES:

For BSMM-8740 the following competencies are taught and tested:

Program Competencies	Course Competencies	Tested by
C3 Problem Solving Apply an evidence-based decision model to evaluate and recommend the best available alternative to resolve an international business problem.	Apply an evidence-based decision model to evaluate and recommend the best available alternative to resolve an international business problem.	Lab Assessments
C4 Literacy and Numeracy Skills Analyze both qualitative and quantitative data and findings, distinguishing and evaluating their relevance to the resolution of international business issues.	Analyze both qualitative and quantitative data and findings, distinguishing and evaluating their relevance to the resolution of international business issues.	Quizzes, Midterm Examination, and Final Examination

COURSE CONTENT:

Date	Topic	Reading Assignment
May 23	Course Introduction Supervised Machine Learning Review	Chapter 1 – Introduction Chapter 2 – Overview of Supervised Learning
May 26	Lab Orientation Supervised Machine Learning Lab	<u>Optional Data Camp Online Module</u> Supervised Learning with scikit-learn
May 30	Linear Classifiers (Logistic Regression and Support Vector Machines)	Chapter 4 – Linear Methods for Classification Chapter 12 – Support Vector Machines and Flexible

Date	Topic	Reading Assignment
		Discriminants
Jun 2	Linear Classifiers Lab	<u><i>Optional Data Camp Online Module</i></u> Linear Classifiers in Python
Jun 6	Model Selection and Optimization	Chapter 7 – Model Assessment and Selection
Jun 9	Model Selection and Optimization Lab	<u><i>Optional Data Camp Online Module</i></u> Assignment — Model Validation in Python Assignment — Hyperparameter Tuning in Python
Jun 13	Tree-Based Models and Ensemble Learning	Chapter 15 – Random Forest Chapter 16 – Ensemble Learning
Jun 16	Tree-Based Models and Ensemble Learning	<u><i>Optional Data Camp Online Module</i></u> Machine Learning with Tree-Based Models in Python
Reading Week, June 19 - 23		
Jun 27	Feature Engineering and Data Pre-Processing	A survey of feature selection and feature extraction techniques in machine learning. https://doi.org/10.1109/sai.2014.6918213
Jun 30	Canada Day – University Closed	
Jul 4	Feature Engineering and Data Pre-Processing Lab	<u><i>Optional Data Camp Online Module</i></u> Feature Engineering for Machine Learning in Python Preprocessing for Machine Learning in Python
Jul 7	Explainable AI (XAI)	Why should I trust you? Explaining the predictions of any classifier. https://doi.org/10.18653/v1/n16-3020 A Unified Approach to Interpreting Model Predictions. https://dl.acm.org/doi/10.5555/3295222.3295230
Jul 11	Explainable AI (XAI) Lab	
Jul 14	An Introduction to Deep Learning	Kaggle Tutorial – Introduction into Deep Learning https://www.kaggle.com/learn/intro-to-deep-learning
Jul 18	Deep Learning Lab	<u><i>Optional Data Camp Online Module</i></u> Introduction to Deep Learning in Python
Jul 21	An Introduction to Recommender Systems	A Complete Guide To Recommender Systems — Tutorial with Sklearn, Surprise, Keras, Recommenders https://towardsdatascience.com/a-complete-guide-to-recommender-system-tutorial-with-sklearn-surprise-keras-recommender-5e52e8ceace1
Jul 25	Recommender Systems Lab	<u><i>Optional Data Camp Online Module</i></u> Building Recommendation Engines in Python

Date	Topic	Reading Assignment
Jul 28	An Introduction to Natural Language Processing	Getting Started with Natural Language Processing (NLP) — preprocessing, word embeddings, text classification, and more! https://towardsdatascience.com/getting-started-with-natural-language-processing-nlp-2c482420cc05
Aug 1	Natural Language Processing Lab	<i>Optional Data Camp Online Module</i> Introduction to Natural Language Processing in Python
Aug 4	Machine Learning Bias Identification and Mitigation.	Lecture Notes based on open-source packages (Fair Learn and IBM Fairness 360)
Aug 8	Machine Learning Bias Identification and Mitigation Lab	<i>Optional Online Reference</i> https://fairlearn.org/ https://aif360.mybluemix.net/
Aug 11	Alternative class week	

The above schedule is subject to change. Students will be notified of any changes. Additional readings may be assigned as necessary.

KEY DATES FOR EXAMS/ASSIGNMENTS:

Date	Exam/Assignment
Jun 9, 2023	Lab Assessment 1
Jun 16, 2023	Quiz1
Jun 27, 2023	Midterm Examination
Jul 16, 2023	Lab Assessment 2
Jul 25, 2023	Quiz 2
Aug 1, 2023	Lab Assessment 3
Aug 12-21, 2023	Final Examination

*Final exams will take place during the university specified final exam period. Students are advised to read Senate Policy on the Conduct of Tests and Exams.

IMPORTANT PROGRAM DATES:

A list of important program dates can be found on the Brightspace Master of Management Program page at <https://brightspace.uwindsor.ca/d2l/le/calendar/136263>.

GRADING:

Grades will be assigned on the following basis:

	%
Quizzes	20
Lab Assessments	30
Midterm Examination	25
Final Examination	25
TOTAL	100

GRADING SCALE POLICIES:

All course work is to be marked and final grades submitted using the 100% scale beginning September 1, 2013. In accordance with the Senate resolution, instructors are to submit whole numbers (e.g., 88, 76, etc.) as percentages. The following University-wide grade descriptors are in effect and will be printed on the back of transcripts:

Letter Grade	Percentage Range
A+	90-100
A	85-89.9
A-	80-84.9
B+	77-79.9
B	73-76.9
B-	70-72.9
C+	67-69.9
C	63-66.9
C-	60-62.9
F	0-59.9

EXAM/ASSIGNMENT DESCRIPTIONS:**Quizzes**

The quizzes can consist of true/false, multiple choice, short answer, and essay questions from all material covered before the date of the mid-term exam. When writing quizzes, you must abide by University of Windsor policies governing plagiarism and academic integrity. Quiz submissions may be subjected to review by automated tools to verify their originality.

Lab Assessments

Lab assessments will require learners to demonstrate the ability to apply methods and techniques to machine learning problem using Python and explain the steps they followed to solve a problem. Assessments must be completed in person during lab sessions.

Midterm Examination

The midterm exam can consist of true/false, multiple choice, short answer, and essay questions from all material covered before the date of the mid-term exam. When writing this exam, you must abide by University of Windsor policies governing plagiarism and academic integrity. Exam submissions may be subjected to review by automated tools to verify their originality.

Final Examination

The final exam can consist of true/false, multiple choice, short answer, and essay questions covering all course material, including material discussed during lab sessions. When writing this exam, you must abide by University of Windsor policies governing plagiarism and academic integrity. Exam submissions may be subjected to review by automated tools to verify their originality.

DIGITAL LEARNING RESOURCES:

Digital resources may be used in this course. They may be required resources which will be used for assessment purposes. The assessments that will rely on these resources constitute 0% of the grade for this course. These resources can be purchased from Not Applicable . The assignment of digital learning resources at the University of Windsor is governed by a policy entitled The Use of Digital Learning Resources for Instructional and Assessment Purposes, which can be reviewed at https://www.uwindsor.ca/provost/sites/uwindsor.ca/provost/files/digital_learning_resource_policy_final_with_link_0.pdf

Should you have any concerns about the assignment of digital learning resources for this course, please let the Master of Management Program Director know in writing, as the University regularly reviews this policy based on campus community feedback.

ODETTE SCHOOL OF BUSINESS COURSE POLICIES:

Please refer to the Odette School of Business Course Policies document for specific information on the following subjects. This Course Policies document is available electronically on each course website, on the Brightspace Master of Management Program page at <https://brightspace.uwindsor.ca/d2l/le/content/136263/viewContent/654482/View?ou=136263> and also in paper form outside each Area Secretary's office on the 4th floor of the Odette building. (Adopted Fall 2009)

Academic Integrity and Code of Conduct
Missed Exams and Late Assignments
Registration, Adding, and Dropping Courses
Odette School of Business Grade Conversion Scale
Odette School of Business Grading Policy
Student Evaluation of Teaching (SET)

MASTER OF MANAGEMENT PROGRAM ETIQUETTE:

The Master of Management program is a culturally inclusive program where it is expected that students, faculty, and staff will recognize, appreciate, and benefit from diversity so as to enhance the learning experience. Promoting a culturally inclusive learning environment encourages individuals to collaborate and develop intercultural respect. The following outlines the protocol for Master of Management students while they are at the University of Windsor:

- All students will communicate in English at all times. It is important for students to continually improve language skills and be inclusive of others from different backgrounds.
- Students will demonstrate respectful behavior toward their peers and professors, regardless of culture, language, values, beliefs, or ideas.

SECONDARY DATA USE, EVALUATION, FOCUS GROUPS AND INTERVIEWS:

This course will be evaluated as part of internal or external quality assurance processes and reporting requirements to funding agencies and as research data for scholarly use. As a student in this course your online student data will be used for evaluating the course delivery and your engagement in the various aspects of the course. This will only occur after final grades have been submitted and approved so it will have no effect on your grade. This course data provides information about your individual course usage and activity during the time that you are enrolled in the course. Your anonymized, aggregated data may also be used in the future in reports, articles or presentations.

During the final week of the course you may also be invited to participate in further research about the course. If you decide to participate you may be asked to fill out anonymous online questionnaires that solicit your impressions about the course design and student learning in the course. The survey participation is voluntary and no questions of a personal nature will be asked. Your participation will have no effect on your grade and your instructor will not know who participated in the surveys.

Finally, at the end of the survey you may also be asked if you want to participate in a focus group or interviews after final grades have been assigned to gather yours and other student opinions about specific course delivery methods and technologies used.

COMMITMENT TO STUDENT WELLNESS:

Feeling Overwhelmed?

From time to time, students face obstacles that can affect academic performance. If you experience difficulties and need help, it is important to reach out to someone.

For help addressing mental or physical health concerns on campus, contact (519) 253-3000:

- Student Health Services at ext. 7002 (<http://www.uwindsor.ca/studenthealthservices/>)
- Student Counselling Centre at ext. 4616 (<http://www.uwindsor.ca/studentcounselling/>)
- Peer Support Centre at ext. 4551

24 Hour Support is Available

- My Student Support Program (MySSP) is an immediate and fully confidential 24/7 mental health support that can be accessed for free through chat, online, and telephone. This service is available to all

University of Windsor students and offered in over 30 languages. Call: 1-844-451-9700, visit <https://keepmesafe.myissp.com/> or download the My SSP app: [Apple App Store](#)/[Google Play](#).

A full list of on- and off-campus resources is available at <http://www.uwindsor.ca/wellness>.

Should you need to request alternative accommodation contact your Instructor, Program Administrator, or Director.

APPENDICES:
