

# MIS 64060-001-26356: Machine Learning - Fall 2020

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Office Hours: TBD

Class Hours: Thursday: 6:35 PM - 9:15 PM

Class Location: Bow 133 and [Virtual](#)

## Course Description

Fundamentals of Machine Learning is one of the core courses of the Master of Science in Business Analytics (MSBA) program. In this course, students learn some fundamentals of machine learning as they can be applied to solve various business problems. Specifically, the course concentrates on classification modelling, segmentation and clustering, and recommendation systems. Students entering the course should be able to operate a computer and navigate Blackboard Learn, have skills in word processing software such as Microsoft Word and have the willingness to learn some basic computer programming using the R language.

## Learning Outcomes

By the end of this course, students will be able to:

- Think critically about how to use machine learning algorithms to solve a given business problem.
- Know how to formulate business problems and identify relevant data to use in modeling frameworks.
- Know how to evaluate the appropriateness and estimate the performance of various machine learning models for a given task.
- Know how to use software tools (such as R) effectively to implement machine learning algorithms for data mining/visualization and analytics;
- Foster the communication and presentation of statistical results and inferences.

## Class Time

This semester, we will be using Blackboard Learn, and specifically, Blackboard Ultra for all our course materials. This particular course has a designated online class, as well as an in-person class. So that students in both classes can benefit from the materials, the course is structured as follows:

- All materials available to online students will be available for in-person students. This includes pre-recorded lectures, access to discussion boards, assignments, and other supporting materials.
- As this is an in-person class, we will have regular lectures at the scheduled class times. This lecture will be simultaneously broadcasted over Blackboard Collaborate Ultra, and also recorded. Any and all students may attend this class. They will also have access to the recorded lectures.
- Assignments and other materials specific to this class will be put in a folder designated as such in Blackboard.

## University Policies

Students are required to be aware of and follow all general and academic policies established by Kent State

University.

### *Covid-19*

While this class is designated as in-person / remote, the danger of covid-19 is ever present. As such, we need to be flexible in terms of all aspects of class management. Some specific aspects are listed below:

- **Communication:** [Sign up for FlashAlerts](#). Check email and Blackboard announcements daily.
- **Health and Safety:** The [Flashes Safe Seven Principles](#) have been implemented to protect your health as well as the entire Kent State community. When you are on campus you must follow the [Flashes Safe Seven](#). As your instructor, I am committed to ensuring a safe environment for all students. Noncompliance by any student may result in cancellation of the class session for the day and referral to the Office of Student Conduct. Primary among them are: 1) Always wear your face covering, 2) Wash your hands frequently, 3) Clean and sanitize your workspace, 4) Stay 6 feet apart - seats in your classroom have been designated as such, 5) Monitor your health every day. Do not come to class if you are unwell.
- **Absence, Illness, and Remote Instruction:** If you do not meet the health safety requirements listed in the [Flashes Safe Seven](#) or become ill, you may access the course through synchronous remote technology available through Blackboard Collaborate Ultra through a recording of our class session; or through notes and materials distributed on Blackboard and any notes your fellow students are willing to share.

### *Students with Disabilities*

Kent State University is committed to inclusive and accessible education experiences for all students. University Policy 3342-3-01.3 requires that students with disabilities be provided reasonable accommodations to ensure equal access to course content. Students with disabilities are encouraged to connect with Student Accessibility Services as early as possible to establish accommodations. If you anticipate or experience academic barriers based on a disability (including mental health, chronic medical conditions, or injuries), please let me know immediately (contact 330-672-3391 or visit [www.kent.edu/sas](http://www.kent.edu/sas) for more information on registration procedures).

### *Course Enrollment and Withdrawal*

University policy requires all students to be officially registered in each class they are attending. Students who are not officially registered for a course by published deadlines should not be attending classes and will not receive credit or a grade for the course. Each student must confirm enrollment by checking his/her class schedule (using Student Tools in FlashLine) prior to the deadline indicated.

If registration errors are not corrected by this date and you continue to attend and participate in classes for which you are not officially enrolled, you are advised now that you will not receive a grade at the conclusion of the semester for any class in which you are not properly registered. Also, it is your responsibility to check the withdrawal dates for each semester.

Every class has its own schedule of deadlines and considerations. To view the add/drop schedule and other important dates for this class, go to Student > Resources > Courses and Registration in FlashLine. Choose View or Print Course Schedule and Purchase Textbooks. To see the deadlines for this course, click on the CRN. The add/drop schedule and important dates may also be found on the Drop or Add a Course link. Click on the green clock next to the course under Registration Deadlines.

### *Plagiarism and Academic Integrity*

Students enrolled in the university, at all its campuses, are to perform their academic work according to standards

set by faculty members, departments, schools and colleges of the university; and cheating and plagiarism constitute fraudulent misrepresentation for which no credit can be given and for which appropriate sanctions are warranted and will be applied.

For more information see the Kent State policy on plagiarism in the University policies section of the Getting Started in Your Online Course link within the Start Here folder.

### *Subject to Change Statement*

The syllabus and course schedule may be subject to change. Changes will be communicated via email or the Blackboard Learn announcement tool. It is the responsibility of students to check email messages and course announcements to stay current in their online courses.

## **Course Content and Instruction**

**Textbook:** There are no required textbooks, but here are some recommended readings:

- Peng, Roger D. R programming for data science. Lulu. com, 2015. This book is freely available at: <https://leanpub.com/rprogramming>. The following parts of the book should be covered:
  - Part 4: Getting Started with R, page 9
  - Part 5: R Nuts and Bolts, pages 10-22
  - Part 6: Getting Data in and out of R, pages 23-30
  - Part 14: Control Structures 62-69
- <https://www.dataminingbook.com/book/r-edition>
- <https://www.dataminingbook.com/book/python-edition>

### **Software:**

- You may use either R or Python for this course.
- If you are using [R](#).
  - Please also install a copy of [RStudio](#). Extensive [help](#) for R is available online. You can also install [Swirl](#), which will help you learn R. Here is [further](#) documentation from the library on the use of R.
  - You will also build a [Shiny](#) app for your presentation. Install that.
- If you are using Python
  - Install Python locally (version 3.x). I would recommend installing [Anaconda](#).
  - You can also use [Jupyter Notebooks](#), or even better, [Google Colab](#).
- We will also be using [GitHub](#) and [Git](#). Please install them, and create a personal account on GitHub. You can also install the [desktop](#) client for GitHub. Both Git and GitHub are well [documented](#).
- The GitHub address for our class is <https://github.com/KSU-MSBA/64060.git>. Synchronize that to your computer.

## **Assessments**

Your grade will be based on your performance of the following assessments.

- Individual assignments (approximately 4-6) - 50%
- Quizzes / Midterm - 25%
- Final Examination / Project - 25%

## Grades

The course will follow the standard +/- grading system. Total percentage below 64 will result in a failing grade for the course.

Grade	A	A-	B+	B	B-	C+	C	C-	D+	D
Min %	94	90	87	84	80	77	74	70	67	64

## Content Outline

Module	Title	Time frame
Module 0	Boot Camp	Week 1
Module 1	Introduction to Machine Learning	Week 2
Module 2	Introduction to R	Week 3
Module 3	Fundamental Concepts in Supervised Learning	Week 4
Module 4	KNN Classification	Weeks 5-6
Module 5	Naïve Bayes Classification	Week 7
Module 6	K-mean clustering algorithm	Weeks 8-9
Module 7	DBSCAN clustering algorithm	Weeks 10-11
Module 8	Hierarchical Clustering	Weeks 12-13
Module 9	Recommendation Systems	Weeks 14-15