

## Syllabus – Spring 2022

**Excluding materials for purchase, syllabus information may be subject to change. The most up-to-date syllabus is located within the course in HuskyCT.**

### Course and Instructor Information

**Course Title:** Predictive Modeling

**Credits:** 3

**Format:** Fully Online, Asynchronous

**Prerequisites:** Open only to MBA and MSBAPM students, others with consent. Corequisite: OPIM 5603.

**Professor:** Jennifer Eigo

**Email:** [jennifer.eigo@uconn.edu](mailto:jennifer.eigo@uconn.edu) (please include course number and section in the subject)

**Office Hours/Availability:** I will have regularly scheduled office hours via WebEx several times a week at various times to best accommodate students. I will send out a survey the first week of class to find the time that works best. Students may also request meetings with me as needed. I will generally respond to emails by the next business day at the latest.

**Office Hours Virtual Location:** <https://uconn-cmr.webex.com/meet/jeigo>

### Course Materials

**Required course materials should be obtained before the first day of class.**

Required textbooks are available for purchase through the [UConn Bookstore](#) (or use the Purchase Textbooks tool in HuskyCT). Textbooks can be shipped ([fees apply](#)).

#### Required Materials:

Item 1. Shmueli, G. (2017). *Data mining for business analytics: Concepts, techniques, and applications with JMP Pro*. Hoboken, NJ: Wiley.

Item 2. Software - JMP Pro 16.1.0 - instructions provided in HuskyCT

Item 3. Internal Camera or Webcam

*Additional course readings and media are available within HuskyCT, through either an Internet link or Library Resources*

### Course Description

Introduces the techniques of predictive modeling in a data-rich business environment. Covers the process of formulating business objectives, data selection, preparation, and partition to successfully design, build, evaluate and implement predictive models for a variety of practical business applications. Predictive models such as neural networks, decision trees, Bayesian classification, and others will be studied. The course emphasizes the relationship of each step to a company's specific business needs, goals and objectives. The focus on the business goal highlights how the process is both powerful and practical.

Technology advancements now allow companies to capture and store large amounts of data (or facts) in databases and data warehouses. With so much raw data, organizations urgently need tools that allow them to effectively sift through these enormous datasets and extract actionable information and knowledge (meaningful patterns, trends, and anomalies) from such data sets to help them optimize businesses. Predictive modeling is the process of developing models to better predict future outcomes for an event of interest by exploring its relationships with explanatory variables from historical data. It is used extensively in businesses to identify risks and opportunities associated with a set of conditions.

The course introduces the techniques of predictive modeling and analytics in a data-rich business environment. It

covers the process of formulating business objectives, data selection, preparation, and partition to successfully design, build, evaluate and implement predictive models for a variety of practical business applications. The primary approach will entail learning key concepts in analytics and then reinforcing using 'learning-by-doing' with the use of the state-of-the-art software SAS JMP. We will also review and understand a variety of statistical tools and processes that form key elements of these techniques. In studying each technique, the goal is for each student to understand the technique and how it can be used to unlock hidden business value. At the completion of the course, each student should be positioned to understand and apply the variety of tools studied. In a given business problem setting, the student should be able to identify, understand, and lead the utilization of the best technique to analyze the data and yield business value.

## Course Objectives

By the end of the semester, students should be able to:

1. Summarize the various aspects of data mining.
2. Analyze a dataset using various statistical and visual approaches to find relationships between variables and to see the distribution of data within each variable.
3. Identify data problems such as missing values, outliers, and data entry errors.
4. Modify a dataset to prepare it for modeling by cleaning data problems, deriving new variables (feature engineering), and reducing dimensionality.
5. Defend data preprocessing choices with clear data-driven justifications.
6. Build and tune complex predictive models that are technically sound. (each time you tune, you're rebuilding)
7. Interpret numeric model output, connecting it in meaningful ways to the underlying business question to be solved.
8. Formulate business recommendations driven by the best model output.

## Course Outline

Module 1: Predictive Modeling Overview

Module 2: Data Visualization

Module 3: Data Preprocessing

Module 4: Clustering & Market Basket Analysis

Module 5: Process of Predictive Modeling & Measuring Model Accuracy

Module 6: Regression Models

Module 7: Decision Tree Models

Module 8: Neural Networks

Module 9: Discriminant Analysis & KNN

Module 10: Naïve Bayes & Ensemble Models

## Course Calendar

The course calendar is posted to the class HuskyCT site.

## Course Requirements and Grading

### Summary of Course Grading:

Course Components	Weight
Video Quizzes	3%
Individual Assignments	15%
Group Project1	15%
Group Project 2	20%
Discussion Posts	5%
Team Evaluations	2%

Exam 1	20%
Exam 2	20%

### **Video Quizzes**

There will be lecture/demo video quizzes in modules 0, 1, 3, 4, 5 & 10. These quizzes are short, with a few multiple choice questions. The quizzes can be taken as many times as you like prior to the due date and your last score will be added to My Grades. The quizzes are not available after the due date passes.

### **Individual Assignments**

Each module has one Individual Assignment to reinforce the concepts taught in that module. Homework will be graded based on the effort you put in. Provide well thought out responses to the questions to receive full credit. Homework is an individual assignment so you must submit your own independent analysis. Each assignment will be graded out of 2 points. The assignments will not be viewable until the scheduled module dates.

- For thorough answers, you will receive 2 points.
- If homework is incomplete or too brief, you will receive 1 point.
- If homework is not submitted, or is copied from another student or the internet, you will receive 0 points.

Please submit all assignments as a word document. Assignments will typically involve some written responses and hands on exercises in JMP. Please take screen snapshots and then paste them into the word document that you submit as specified to illustrate your results.

The following statement must be present on each and every assignment submission: "The work contained and presented here is my work and my work alone."

### **Group Project 1**

The first group project will reinforce the preprocessing work learned in the first half of the semester. You will be given a dataset and it will be your task to prepare the dataset for modeling. You must apply your learnings in the first several lectures. The final deliverable is a preprocessed dataset and paper documenting your preprocessing steps.

### **Group Project 2**

In the second group project you are expected to discover/predict interesting relationships and patterns using a significant amount of real data. You will explore/analyze/mine interesting data sets and present and describe your findings. In other words, describe: (a) the data and how it was collected, (b) what you might be looking for in such data (e.g., potentially interesting/important business questions that could be explored/answered using this data), (c) the tools/techniques that you used, (d) the results that you obtained, (e) and the conclusions that you can draw (e.g., the actions that one can take in response to the findings).

Each group has to obtain the instructor's permission regarding the appropriateness of the topic chosen by submitting a project proposal.

### **Discussion Posts**

After Group Project 2 is complete, you must view presentations by at least three other teams and comment on the team's work. You can highlight what you think they did well, ask clarifying questions on anything that might be unclear, or comment on any improvements or enhancements to their work that you think might add value.

### **Team Evaluations**

Peer evaluations will play a role in determining the scores awarded to individual group members on the group-oriented components of the course. Individuals who assume leadership roles and/or who perform more than their fair share of the work and/or whose work is consistently of superior quality are likely to receive scores that are above the group's average scores. Individuals who do less than their fair share of the work or work that is consistently below average will receive scores that are less than the group average. You will be graded on completing the two team evaluations on time. The content of your peers' evaluation of you will be taken into account in the grade you earn for the projects themselves.

### **Exams 1 and 2**

Exam 1 will cover the content taught in Modules 1 through 5. Exam 2 will cover the content taught in Modules 6

through 10. The exams will be online, open notes, open books. However, it is an individual effort. Do not work on the exam or discuss the exam with other students. Also, do not seek any outside help from anyone other than your professor while taking the exam. Please be a good person who takes pride in a fair assessment of your own knowledge. The exams will be proctored by your professor or a student worker via WebEx with screen sharing and web cam turned on.

## Grading Scale:

### Graduate

Grade	Letter Grade	GPA
93-100	A	4.0
90-92	A-	3.7
87-89	B+	3.3
83-86	B	3.0
80-82	B-	2.7
77-79	C+	2.3
73-76	C	2.0
70-72	C-	1.7
67-69	D+	1.3
63-66	D	1.0
60-62	D-	0.7
<60	F	0.0

Final grades will not be rounded. For example, if you earn a 92.95 this will be recorded as an A- because you have not crossed the threshold required of the next letter grade.

## Due Dates and Late Policy

All course due dates are identified in the Course Schedule listed in HuskyCT. Deadlines are based on Eastern Time; if you are in a different time zone, please adjust your submittal times accordingly. *The instructor reserves the right to change dates accordingly as the semester progresses. All changes will be communicated in an appropriate manner.*

Work submitted up to 24 hours late will receive a 25% reduction in the grade that it would otherwise earn. Assignments submitted from 24 to 48 hours late will receive a 50% reduction in the grade. Assignments submitted after 48 hours beyond the due date will receive a zero.

## Academic Misconduct

In the event that cheating, plagiarism, or other scholarly misconduct is found on any graded component of the class, consequences will range from a zero given as the grade, up to failing the class, depending on the severity of the offense. Please note that in cases of plagiarism amongst students (where one student shares their work with another), BOTH students are equally responsible for the plagiarism and BOTH students will face a penalty. In addition to consequences to the student's grade, the academic misconduct is reported to the The Graduate School, the Associate Dean of Graduate Programs, the Department Head, the Academic Director, and the MSBAPM Program Director in accordance with the [Scholarly Integrity and Misconduct](#) policy.

## Feedback and Grades

I will make every effort to provide feedback and grades within 7 days. To keep track of your performance in the course, refer to My Grades in HuskyCT.

## Weekly Time Commitment

You should expect to dedicate 9 to 12 hours a week to this course. This expectation is based on the various course activities, assignments, and assessments and the University of Connecticut's policy regarding credit hours. More information related to hours per week per credit can be accessed at the [Online Student website](#).

## Student Authentication and Verification

The University of Connecticut is required to verify the identity of students who participate in online courses and to establish that students who register in an online course are the same students who participate in and complete the course activities and assessments and receive academic credit. Verification and authentication of student identity in this course will include:

1. Secure access to HuskyCT using your unique UConn NetID and password.
2. ID verification for Exams 1 and 2 where your identity will be compared to your student ID or a government issued ID.

## Student Responsibilities and Resources

As a member of the University of Connecticut student community, you are held to certain standards and academic policies. In addition, there are numerous resources available to help you succeed in your academic work. Review these important [standards, policies and resources](#), which include:

- The Student Code
  - Academic Integrity
  - Resources on Avoiding Cheating and Plagiarism
- Copyrighted Materials
- Credit Hours and Workload
- Netiquette and Communication
- Adding or Dropping a Course
- Academic Calendar
- Policy Against Discrimination, Harassment and Inappropriate Romantic Relationships
- Sexual Assault Reporting Policy

## Students with Disabilities

The University of Connecticut is committed to protecting the rights of individuals with disabilities and assuring that the learning environment is accessible. If you anticipate or experience physical or academic barriers based on disability or pregnancy, please let me know immediately so that we can discuss options. Students who require accommodations should contact the Center for Students with Disabilities, Wilbur Cross Building Room 204, (860) 486-2020 or <http://csd.uconn.edu/>.

Blackboard measures and evaluates accessibility using two sets of standards: the WCAG 2.0 standards issued by the World Wide Web Consortium (W3C) and Section 508 of the Rehabilitation Act issued in the United States federal government.” (Retrieved March 24, 2013 from [Blackboard's website](#))

## Software/Technical Requirements (with Accessibility and Privacy Information)

The software/technical requirements for this course include:

- HuskyCT/Blackboard ([HuskyCT/ Blackboard Accessibility Statement](#), [HuskyCT/ Blackboard Privacy Policy](#))
- [Adobe Acrobat Reader](#) ([Adobe Reader Accessibility Statement](#), [Adobe Reader Privacy Policy](#))
- Google Apps ([Google Apps Accessibility](#), [Google for Education Privacy Policy](#))
- Microsoft Office (free to UConn students through [uconn.onthehub.com](http://uconn.onthehub.com)) ([Microsoft Accessibility Statement](#), [Microsoft Privacy Statement](#))
- Dedicated access to high-speed internet with a minimum speed of 1.5 Mbps (4 Mbps or higher is recommended).
- SAS JMP version 16 ([JMP Privacy Policy](#), [SAS Accessibility Statement](#))

For information on managing your privacy at the University of Connecticut, visit the [University's Privacy page](#).

**NOTE:** This course has NOT been designed for use with mobile devices.

## Help

[Technical and Academic Help](#) provides a guide to technical and academic assistance.

This course is completely facilitated online using the learning management platform, [HuskyCT](#). If you have difficulty accessing HuskyCT, you have access to the in person/live person support options available during regular business hours through the [Help Center](#). You also have [24x7 Course Support](#) including access to live chat, phone, and support documents.

For assistance installing JMP, please email [help@business.uconn.edu](mailto:help@business.uconn.edu).

## **Minimum Technical Skills**

To be successful in this course, you will need the following technical skills:

- Use electronic mail with attachments.
- Save files in commonly used word processing program formats.
- Copy and paste text, graphics or hyperlinks.
- Work within two or more browser windows simultaneously.
- Open and access PDF files.

University students are expected to demonstrate competency in Computer Technology. Explore the [Computer Technology Competencies](#) page for more information.

## **Evaluation of the Course**

Students will be provided an opportunity to evaluate instruction in this course using the University's standard procedures, which are administered by the [Office of Institutional Research and Effectiveness](#) (OIRE).

Additional informal formative surveys may also be administered within the course as an optional evaluation tool.