

Data Science for Business : Technical
TECH-GB 2336 Sections 30,31
TECH-UB Sections, 57 001-002

DRAFT: as of 10/10/2023

Professor: Dr. Chris Volinsky
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Class Time:

- TECH-GB 2336 Section 30
 - o Wed 6-9PM
- TECH-GB 2336 Section 31
 - o Thu 6-9 PM
- TECH-UB Sec 57 001
 - o M W 9:30-10:45 AM
- TECH-UB Sec 57 002
 - o M W 11:00 – 12:15

Classroom: TBD

Note: It is required that you have some programming experience in Python prior to taking this class. You do NOT have to be a Python expert or an expert coder. Any introduction to Python class and some experience with programming should suffice. We will not be teaching Python basics or fundamentals in this class - you are expected to already know how to work with Python notebooks, libraries, and functions and you likely will not have time to learn on the fly.

Course Objectives:

This course will teach you how to think about data based problems in the business world through the lens of data analytics. We will focus on data-analytic thinking, how to approach problems, how to develop insights using data, how to apply machine learning and other analytic techniques, how to validate and assess algorithmic results, and how to communicate those results to a business audience.

We will study the fundamental principles and techniques of data science, machine learning, and data-driven artificial intelligence, all by the examination of real-world examples and case studies to place data science techniques in context.

After taking this course you should:

1. *Approach business problems data-analytically.* Think carefully & systematically about whether & how data can improve business outcomes, to make better-informed decisions for product management, marketing, sales, operations, consulting, etc.
2. *Understand the fundamental principles of data science that underlie processes, algorithms & systems.* Know when and how to apply different methods, and how to evaluate and communicate them
3. *Have had hands-on experience implementing machine learning algorithms in relevant business contexts.* This includes a term project using data of your choosing analyzing data for a relevant business problem.

Textbook:

The **mandatory** textbook for the class will be the following.

Data Science for Business: What you need to know about data mining and data analytic thinking.
Provost & Fawcett (O'Reilly, 2013) – **2nd Edition**

This book covers the fundamental material that will provide the basis for you to think and communicate about data science and business analytics. We will complement the book with discussions of applications, cases, and demonstrations, and possibly some additional readings or notes for material that is not covered in the book.

Software:

As noted above, some working knowledge of Python is required as a prerequisite. We will spend our time exploring the data analysis and machine learning libraries that you will use through the class (mainly Pandas and sklearn). We will provide several iPython notebooks that we will work through together to help you learn the basics of the key data science and machine learning libraries. These notebooks will help you learn the tools you will need for your term project.

I will be sharing Python notebooks with you that are stored in a Github repository, and we will be running the notebooks on [Google's Colab platform](#). You must have access to a computer on which you can access and run the class Colab notebooks. If you do not have such a computer, please see me immediately so we can make alternative arrangements. You should bring your computer to class. If you need additional help with Colab or Python, please see me or the teaching assistants.

Grading:

- Homework: 25%
- Exams (Three in-class quizzes plus final): 40%
- Term Project: 30%

- Participation / Attendance: 5%

Grading Policies:

Homework: Homeworks are required and important. Homework is due at the exact start of class on the day listed. Since we will be discussing HW answers in class – NO LATE HOMEWORKS WILL BE ACCEPTED. Homeworks can be done collaboratively, but each student is required to submit their own homework and be responsible for their learnings. Be as clear as possible with your reasoning (show your work) and make it clear when you are using outside sources (including ChatGPT). This will make it more likely to get partial credit if you are incorrect.

Quizzes: Three in-class quizzes will be done throughout the year. Quizzes will be closed book, and done at the very start of class, with no make-ups for late or missing students. Please bring a calculator that is not a communication device.

Final: The final will be closed book. The final is comprehensive to the whole course. These will be open notes, but you will not be using your computer or phone. Please bring a calculator that is not a communication device. **Make-up exams will not be offered** – if you have a hardship requiring you to miss an exam, you will need to let me know with at least a week's notice, with a documented reason.

Participation/Attendance: This is a measure of a student's engagement in the course. For students who show up to class and participate in discussions – inside or outside of class – they will receive the full 5%. Other opportunities to boost this component include seeking help on HW or course material through office hours, participating in online discussion, or reaching out to the professor or teaching fellow for extra help. Poor attendance, late arrivals or leaving class early will lower this component. Please feel free to reach out to me to discuss the participation aspect at any time.

Class project: Your class project will consist of: defining a business problem that can be addressed by collecting data; writing up and proposing the analysis; collecting the data; cleaning and preparing the data; performing the proper analysis; providing an appropriate evaluation and defense of the model selected; and communication of the results via a presentation. You will have several benchmarks over the course of the term to meet in order to successfully complete the project, including an initial proposal writeup of the business question, and a "plan of attack". More will be described in class. **You can work in groups of up to size 4 for the project.**

Other Policies:

- **Religious Holidays:** NYU Stern is committed to ensuring an equitable educational experience for all students regardless of identity or circumstances and strives to recognize the obligations its students have outside of Stern. Please review all class dates at the start of the semester and review all course requirements to identify any foreseeable conflicts with exams, course assignments, projects, or other items required for participation and attendance. If you are aware of a potential conflict, please contact me at the start of the semester to discuss any potential conflicts to determine whether/how they can be accommodated.
- **Accommodations:** If you will require academic accommodation of any kind during this course, you must notify me at the beginning of the course and provide a letter from the Moses Center for Student Accessibility (212-998-4980, mosescsa@nyu.edu) verifying your registration and outlining the accommodations they recommend. If you will need to take an exam at the Moses Center for Student Accessibility, you must submit a completed Exam Accommodations Form to them at least one week prior to the scheduled exam time to be guaranteed accommodation.
- **In-class:** You should bring a laptop to class with you if possible, as there will be occasional group projects that will require a laptop for analysis. If you do not have a laptop, I can make sure you are in a group that does have one. **When class is in session and during lectures I expect that your phones will be turned off and inaccessible and laptops will be closed.** If you wish to use a device for note-taking, please come see me.
- **Inclusion:** This course strives to support and cultivate diversity of thought, perspectives, and experiences. I am committed to every student feeling a sense of belonging in the classroom. If for any reason you feel excluded, I ask that I be your first point of contact to discuss your concern. I am open to hearing your concerns and learning from each other.
- **Academic Integrity:** We take pride in our well-rounded education and approach our academics with honesty and integrity. Indeed, integrity is critical to all that we do here at NYU Stern. As members of our community, all students agree to abide by the [NYU Academic Integrity Policies](#) as well as the NYU Stern Student Code of Conduct, which includes a commitment to:
 - Exercise integrity in all aspects of one's academic work including, but not limited to, the preparation and completion of exams, papers and all other course requirements by not engaging in any method or means that provides an unfair advantage.
 - Clearly acknowledge the work and efforts of others when submitting written work as one's own. Ideas, data, direct quotations (which should be designated with quotation marks), paraphrasing, creative expression, or any other incorporation of the work of others should be fully referenced.
 - Refrain from behaving in ways that knowingly support, assist, or in any way attempt to enable another person to engage in any violation of the Code of Conduct. Our support also includes reporting any observed violations of this Code of Conduct or other School and University policies that are deemed to adversely affect the NYU Stern community.

- **Stern Code of Conduct:** The Stern Code of Conduct and Judiciary Process applies to all students enrolled in Stern courses. Information can be found here: <https://www.stern.nyu.edu/uc/codeofconduct>. The full Student Conduct Policy can be found here: <https://www.nyu.edu/about/policies-guidelines-compliance/policies-and-guidelines/university-student-conduct-policy.html>