Syllabus

Villanova University

Course: CSC 8000 - Programming for ML
Term: Spring 2026
Instructor: Dr. Maurício Gruppi
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Office: Mendel Hall, 292A
Last updated: January 12, 2026

🔗 Quick links

- Course Schedule
- Textbook Github Repository

🕐 Meeting times and locations

- **Section 001**: Wed 6:15 PM - 09:00 PM, Mendel Hall 154

🕐 Office hours

- **Dr. Gruppi**:
  - Tue/Thu 1PM-2PM in Mendel 292A
  - Wednesdays 5 PM-6 PM in Mendel 292A
  - *Note: You do not have to book a time to come to office hours, but I do appreciate if you let me know in advance that you will be coming.*
  - *Available at other times or via Zoom upon request.*

**All office hours subject to change. Updates will be posted.*

TL;DR

- 🙋 **Be present:** Avoid phones and off-task laptop use during class; step out if you need to use your phone.
- 📈 **Assessments**: In-class labs, one exam, one homework, final project + presentation.
- 📖 **Textbook: Python Data Science Handbook, 2nd Edition**.
- 📅 **Deadlines**: Communicate early if exceptional circumstances arise.
- 🤖 **AI Tools**: Can be helpful for learning; do not submit AI-generated work as your own. Follow the disclosure rules below.
- 🎯 **Goal**: Your success. Reach out early and often.

Contents

📖 Main references

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- Textbook: "Python Data Science Handbook (2nd Edition)" by Jake VanderPlas. O'Reilly Media Inc., 2023.
- Lecture notes and assignments will be available on the course LMS page.

📋 Course content

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The following topics are covered in this course:

Module	Description
1. Python basics	Control structures, debugging, Jupyter notebooks.
2. Efficient array manipulation	NumPy, universal functions, aggregation, broadcasting, filtering.
3. Data manipulation	Pandas Data Frames, merges and joins, aggregation, grouping, time series.
4. Data visualization	Matplotlib and Seaborn, data distributions and patterns.
5. Introduction to Machine Learning	Scikit-Learn, supervised learning: classification and regression; unsupervised learning: clustering, dimensionality reduction; overfitting, model selection, feature engineering.

📋 Course structure

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- **In person** at scheduled time and location.
- **Weekly plan on LMS**: topics, readings, deliverable deadlines, and exam dates.
- **Lecture recordings** available upon request (see policy below).

🎯 Course goals

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The goal of this course is to teach students the key components of Python used in machine learning applications. This includes a general overview of the Python language and the introduction of various libraries used in data science and machine learning.
Upon successful completion of the course, the student will be able to:

a. Understand the basic concepts of Python: control structures, syntax, work with Jupyter Notebooks.

b. Manipulate numerical data with NumPy.

c. Manipulate and produce statistical analysis of complex datasets using Pandas.

d. Produce data visualization with Matplotlib and Seaborn.

e. Understand the basic concepts of Machine Learning: learning paradigms, training/validation/test data, feature engineering, and use Scikit-Learn to implement ML models.

📈 Assessment

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Assessment of the learning goals in the class consists of in-class exercises (labs), a midterm exam, a homework assignment, a final project, and a final exam.
Grades will be distributed with the following activities:

Assignment	**Points**
In-class labs	10%
Homework	10%
Midterm exam	20%
Project	40%
Project presentation	20%
Total	100%

A description of each assessment module as well as their related goals is shown in Table 1. The final grade cutoff points are displayed in Table 2.

Assessment	Description	Goals assessed
In-class labs	Hands-on exercises administered at the end of a lecture. All labs will be scheduled and students must show substantial progress before the end of class to get credit for the activity.	Application, interpretation, problem solving.
Homework	Produce code and report describing an analysis of pre-defined datasets.	Application, problem solving.
Midterm exam	Written exam that will take place on the scheduled date.	Fundamental understanding, problem interpretation, problem solving.
Project	A project spanning several weeks where students must implement a complete data analysis pipeline on a dataset of choice.	Application, problems solving.
Active participation	Points given for students who demonstrate active participation during the course, such as asking/answering questions during class and attending office hours.	Human aspect of learning, care for the topic.

Table 1: Assessment modules

Grade	Cutoff	Grade	Cutoff
A	95	C	73
A-	90	C-	70
B+	87	D+	67
B	83	D	63
B-	80	D-	60
C+	77	F	< 60

Table 2: Letter grade cutoff points

✅ Attendance

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Attendance is expected for a successful completion of this course. The instructor will register the attendance at the beginning of every class.
As per university guidelines, if the number of unexcused absences for first year students exceeds twice the number of weekly classes (four absences for a course that meets twice a week), then such student will receive a failing grade "Y".

Personal Days

In addition to the attendance policy stated above, students are entitled to one excused absence for any reason that may contribute to their personal wellness. Students must advise the instructor by email before class of their intent to utilize a Personal Day as the reason for their absence. A Personal Day will not be approved retroactively. Students may, but are not required, to provide additional information regarding their absence. Additionally, a Personal Day may not:

a. be used immediately preceding or following a University holiday or break period;

b. be used on days when exams, presentations or other major assignments are scheduled.

A Personal Day does not grant an automatic extension for items due. Students remain responsible for all assignments, exams, presentations, etc. due on that date. It is in the instructor's discretion to determine whether any extension is appropriate given individual circumstances.

💻 Technology

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- **Required**: Laptop capable of running: Python (3.12+), Jupyter/VS Code, numpy, pandas, matplotlib, scikit-learn. Use laptops **only** for in-class activities.
- Phones are a big distraction in class. Being concentrated on your phone during a lecture is also disrespectful to the instructor and colleagues. ***If you need to use your phone, do it outside the classroom***.
- All homework and projects **must be typeset**, unless otherwise stated. Students should make use of a computer and a text editor to write reports and homework solutions and **submit them in PDF format**.

🤖 Use of Artificial Intelligence (AI) tools

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AI tools (e.g., Copilot, ChatGPT, Gemini) can support learning, but submitting AI-generated work as your own is prohibited and may constitute an Academic Integrity violation.

Allowed AI use (with disclosure)

- Brainstorming outlines, datasets and data collection methods, clarifying concepts, drafting figure captions.
- Code explanations and debugging suggestions (you must write/own final code).
- Grammar/spell-check for your writing.
- Assistance with presentation preparation.

Prohibited AI use

- Generating solutions or code you submit without substantial modification and understanding.
- Using AI during exams or in-class assessments.

Required AI Usage Statement (if used)

Include a short note in your submission (e.g., in the README or report appendix) describing what tool, for which purpose, and how you verified the output. You may use the following template:

AI Usage Disclosure (Course: CSC 8000 - Programming for ML) Tool(s) used: [e.g., Copilot, ChatGPT, Gemini] Purpose: [brainstorming, debugging, caption drafting, etc.] Sample prompts: [list the most relevant prompts you used for each purpose] Verification: [how you validated outputs, what you rewrote or corrected] Authorship: I confirm the submitted work reflects my own understanding and writing.

🕐 Late work

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As it is every member's responsibility to contribute to the creation of a healthy and safe community, students are required to comply with University health and safety directives, guidelines, rules, regulations and protocols in times of emergency and/or public health concern. Violations may be referred for action under the Code of Student Conduct.

✍️ Student conduct

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Office of Disabilities and Learning Support Services

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It is the policy of Villanova to make reasonable academic accommodations for qualified individuals with disabilities. All students who need accommodations should go to Clockwork for Students via myNOVA to complete the Online Intake or to send accommodation letters to professors. Go to the LSS website or the ODS website for registration guidelines and instructions. If you have any questions please contact LSS at 610-519-5176 or learning.support.services@villanova.edu, or ODS at 610-519-3209 or ods@villanova.edu.

Academic Integrity

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All students are expected to uphold Villanova's Academic Integrity Policy and Code. Any incident of academic dishonesty will be reported to the Dean of the College of Liberal Arts and Sciences for disciplinary action. You may view the University's Academic Integrity Policy and Code for a detailed description.

Absence for Religious Holidays

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Villanova University makes every reasonable effort to allow members of the community to observe their religious holidays, consistent with the University's obligations, responsibilities, and policies. Students who expect to miss a class or assignment due to the observance of a religious holiday should discuss the matter with their professors as soon as possible, normally at least two weeks in advance. Absence from classes or examinations for religious reasons does not relieve students from responsibility for any part of the course work required during the absence. For more information, see Religious Holidays.

Lecture recording

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This course, including your participation, will be recorded on video and may be made available to students in the course for viewing remotely. Course videos and materials belong to your instructor, the University, and/or other sources depending on the specific facts of each situation, and are protected by copyright. Do not download, copy, or share any course or student materials or videos without the explicit permission of the instructor. For questions about recording and use of videos in which you appear please contact your instructor.

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