



Syllabus-Fall 2023

Title of Course-Section:	Stat 279-501 (T: Data science)
Name of Department:	Mathematics, Engineering, & Computer Science
Instructor:	Andisheh Dadashi, Assistant Prof. of Mathematics
E-Mail:	andisheh@unm.edu
Class Meeting Days/Times:	No scheduled lecture
Credit Hours :	3 credit hours
Class Location:	Online (info on UNM CANVAS)
Office Location:	Online via Zoom (info on UNM CANVAS)
Office Hours:	Thursdays: 8 am to 12 pm or by appointment

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HOW TO EMAIL



When emailing me, in the subject of your email, please write down your course name, course number, and section number. For example, the subject of your email to me should be: **CS 108L-553**

You must only contact me with your **UNM e-mail**. Check your **UNM email frequently**. You are responsible for missing any announcement I send via email or posted on Canvas. Failure to identify your message with the class number, and not using your UNM email will result in no response at all.

Instructor's Availability Via email:

- The best way of contacting me will be via email (with proper subject mentioned ****Above****).
- In all cases please, be patient and give me 24 hours to 48 hours to reach back to you.
- I will be available via email during the weekday until 5 pm.
- I may not be able to respond to any email on Saturday and Sunday.

Note: The instructor reserves the right to change the syllabus at any point of time during the semester.

Get to know your instructor:



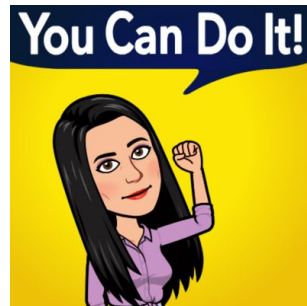
Andisheh Dadashi is an Assistant Professor of Mathematics and CS in the Department of Mathematics, Engineering, & Computer Science Division at the University of New Mexico-Valencia Campus. She received her Bachelor's degree in Mathematics and CS in Iran and completed her first Master's degree in Mathematics in India. Andisheh received a second Master's degree in CS from the University of New Mexico (UNM) in 2016 and is currently a Ph.D. candidate in the UNM Computer Science Department. Previously, Andisheh was a visiting Lecturer II at UNM-Gallup where she implemented the Critical Technology Studies Program (CTSP) from the main campus. At UNM-Gallup, Andisheh helped prepare student scholars for careers in the Intelligence Community (IC) and related national security careers. Andisheh now continues this work at UNM-Valencia where she helps interested students develop the knowledge, skills, and relationships necessary to successfully compete for IC careers. Her research interests include computational biology and genetics, and metabolic networks. Currently, Andisheh's research focuses on developing theory, computational approaches, and statistical tools to uncover mechanisms of rapid polygenic adaptation in response to environmental change.

To know **Andisheh** watch this video <https://youtu.be/t4ryQfdrSEo>



Data science is an interdisciplinary field that uses scientific methods, processes, algorithms, and systems to extract knowledge and insights from many structural and unstructured data. Data science combines multiple fields including statistics, scientific methods, and data analysis to extract value from data. Data scientists use examine which questions need answering and where to find the related data.

How to be successful in a Programming class?



Programming classes tend to be hard. There are a few reasons for this: Programming is a different way of thinking, which some people find hard. Students tend to underestimate the time it takes to write and run programs. This usually has to do with an error or bug. Students overload their class schedules.

What to do:

Start early, the more time you give yourself to develop, write and test your program increases the amount of time you have to:

Get help from Myself or find a good resource online or if you are stubborn (quite like myself) spend time to figure the bug/error out and fix it.

Come to class or watch all the videos!

The first few assignments will be easy, and you will naturally think that the final project can be done in an hour. Don't make that assumption!

Start your Projects and assignments early.

What not to do:

Starting the homework and projects late.

Not watching the videos. Not reading before class. Note: There are a lot of things to cover, if you read before class you will have a better understanding of the material and will be able to form better questions.

Not reading after class because you didn't read before class.

Evaluation/Grading Methods

Your final grade in this class is based on the following components:

4 Projects (Weight varies)	70 %
Class Participation	30%
Overall	100 %



Passing grade is 70% or better. F is a grade lower than 60%

Overall Grades: pluses and minuses may or may not be added to letter grades at the instructor's discretion. Grades of A+ are not rare and will only be awarded for exceptional work.

Grade	From	To	Grade	From	To	Grade	From	To
A+	98	100	B+	87	89.99	C+	77	79.99
A	93	97.99	B	83	86.99	C	73	76.99
A-	90	92.99	B-	80	82.99	C-	70	72.99

Teaching Materials



Q. Where can you find the materials for this class? **Canvas** <https://canvas.unm.edu>

Q. Where do you find the projects? **Canvas**

Q. Where do you submit the projects? **Canvas**

Q. Where do you find your grade? **Canvas** (Gradebook)

Course information including this syllabus, and all the necessary materials and links, etc. will be available via Canvas.



Course Description: We will be using the Python programming language to learn aspects of data science. The subject matter will emphasize both being able to program in Python and learning elements of data science including visualization, reading in and summarizing data organized as spreadsheets, manipulating and summarizing text data, clustering, classification, probability, simulation, and other topics.

1. Learn techniques for analyzing data using the Python language.
2. Be able to combine data from multiple sources and file formats.
3. Learn the basics of discrete probability, including set notation and some distributions such as binomial, Poisson, discrete uniform, and others.
4. know the definitions of expected value, variance, standard deviation, probability, and conditional probability.
5. Be able to apply Bayes' Theorem to word problems.
6. Be able to manipulate and analyze text data.
7. Learn methods for classification.
8. Students will analyze data using regression and correlation.
9. By the end of the class you will be able to use Python to analyze data.
10. By the end of the class you will be able to summarize data using statistics and visual aids (graphs).
11. By the end of the class you will be able to clean data sets to make them more usable for statistical analysis.
12. By the end of the class you will be able to simulate data from some probability models.
13. By the end of the class you will be able to describe data by writing reports readable by people with little to no knowledge of data science.

Why Python?

Python started out as a simple scripting language, but now it's one of the most popular programming languages.

Python is a 'high' level language.

Python is easy to read.

Python is an interpreted language.

All languages have a syntax to learn.

These are the rules by which you write your programs.

We must first learn these rules in order to use Python to solve problems.

It is Free for anyone.

Is mostly cross-platform (File management is usually the only issue)

All the tools for Python are free.

Python can run on a phone.

More resources to learn and examples than in almost any other language.

If you publish your code using Python then anyone in the world can run it, and probably understand what you are doing.

TECHNOLOGY REQUIREMENT



Access to a reliable and fast internet connection is required. For the course, we use Canvas <https://canvas.unm.edu> to navigate through the teaching materials and assignments, but students must also be able to navigate and use other online resources.

Students are required to download and install Python on their computer:

How to download Python:

To learn how to install Python, Jupyter Notebook and other IDE, please, watch the following video that I recorded for you <https://youtu.be/XctjwKgChsY> ** Watch the Video 00: (Installation) on CANVAS to learn how to download and install Python.

Also, please read the following:

Step 1:

First install Anaconda. It provides a fresh version of Python 3 that does not interfere with any other versions of Python that you may have on your computer, and it gives you one-stop shopping for all packages that are used in the book.

Visit <http://www.anaconda.com/download>

Instruction: Choose your operating system (Mac, Win, Linux, or ...), Choose Python 3.7, Download the installer.

Follow the detailed "Installation Instructions" . We suggest that you decline the option of installing Microsoft Visual Code at the end of the installation process. You do not need it for the book.

Step 2:

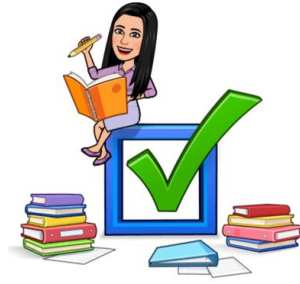
We will use Jupyter Notebook in the class and you must submit your assignments in Jupyter Notebook. If you download anaconda then you will have access to the Jupyter Notebook.

<https://jupyter.org>

You can use any IDE such as Spyder 3 and PyCharm CE IDEs (Integrated Development Environment) for coding in Python.

Spyder IDE is included in Anaconda therefore as long as you download Anaconda you have access to Spyder IDE. For PyCharm CE IDEs from JetBrains you can download it from the following website (use your unmc email to create an account for free access):

<https://www.jetbrains.com/pycharm/download/section=mac>



Book: There are multiple optional textbooks that you can find helpful for this course and all of them are optional.

1. Python for Data Analysis, 2nd edition, by Wes McKinney, published by O'Reilly. This book is only recommended. Note that it is available for free as a pdf if you search for it through the UNM library.
2. Applied Data Science with Python and Jupyter by Alex Galea, Released October 2018, Publisher(s): Packt Publishing, ISBN: 9781789958171.
3. Fundamentals of Data Science with Python by Nicolas Rangeon, Released December 2019, Publisher(s): Packt Publishing, ISBN: 9781789133981.
4. Data Science with Python and R (Anaconda Video Series) by Ian Stokes-Rees, Released February 2017, Publisher(s): Addison-Wesley Professional, ISBN: 0134672615.
5. Data Science with Python by Rohan Chopra, Aaron England, Mohamed Noordeen Alaudeen, Released July 2019, Publisher(s): Packt Publishing, ISBN: 9781838552862.

There are many tutorials and online resources available. Some examples include

- Computational and Inferential Thinking: The Foundations of Data Science by Ani Adhikari and John DeNero. <https://www.inferentialthinking.com/chapters/intro.html>
- Online Statistics: An Interactive Multimedia Course of Study. Project leader: David M. Lane. <http://onlinestatbook.com/2/index.html>
- How to Think Like a Computer Scientist (Python) by Jeffrey Elkner, Allen B. Downey, and Chris Meyers. <http://interactivepython.org/runestone/static/thinkcspy/index.html>

A student's grade is determined by points earned out of 100. The following sections give a breakdown of points; any changes in % or assignments will be based on class needs and communicated early.

- 4 Projects (**70 %**)
 - Projects are posted on Canvas under the assessment module.
 - Projects must be submitted online on Canvas before the due date.
 - Projects must be submitted in Jupyter Notebook format (.ipynb)
- Participation points (**30%**)
 - Participation points are earned by watching the videos (read the announcements on Canvas for more info.).
 - Participation points must be submitted online on Canvas under the assessment module before the due date.
 - Participation points must be submitted in pdf format (.pdf)
- Total = **100%**

PUNCTUALITY IS EXPECTED



The due date for the assignments, quizzes, and exams are very firm. Please manage your time wisely in order to prevent any delay. No late assignment is accepted unless in the event of a genuine emergency per the instructor's discretion.

If you must miss an exam, you must contact your instructor a couple of days before the day of the exam in order to discuss a make-up test. Make-up tests will be given solely at your instructor's discretion and only in cases of well-documented excused absences. If you miss an exam and do not contact your instructor immediately, you may be dropped from the course. No early exams will be permitted except in documented emergencies: flight reservations, weddings, vacations, birthdays, non-NCAA sporting events etc. are not considered emergencies.

Your Responsibility

EXPECTATIONS: Students are expected to conduct themselves in a polite, courteous, professional and collegial manner. Cell phones must be set on silent and be out of sight during class. No food or drink is allowed in the computer labs.

Time required for This Course: Plan to spend a minimum of 9 to 12 hours per week for this class. There is no guarantee you will pass if you dedicate this amount of time, you still need to learn the material and use your time wisely, but those who pass generally are the ones who spend the time needed to do the work to learn the material.

You are responsible for all material covered in this Syllabus and in class, in assigned readings, and on homework assignments. Not all material on tests will necessarily be covered in class but will be in the assignments. The use of cell phones, headphones, etc. is not permitted in class or exams.

RESPECT IS EXPECTED



According to the Code of Conduct as stated in the Policies and Regulations for UNM, student activities that interfere with the rights of others to pursue their education or to conduct their University duties and responsibilities will lead to disciplinary action.

This includes any activities that are disruptive to the class and any acts of academic dishonesty. Students are expected to behave in a courteous and respectful manner toward the instructor and their fellow students. Students may be dropped from a class for inappropriate behavior. For more information: <https://pathfinder.unm.edu/code-of-conduct.html>

Since we assume you are all adults, we will expect from you, respectful adult behavior. Engaging in disruptive or unruly behavior could result in your being asked to leave, at which time you will be counted absent and a referral will be sent to the Dean of Instruction. Continuing to behave in this way could result in your being dropped from the course. Disruptive or unruly behavior includes but is not limited to:

- texting or talking on your cell phone or Laptop at any time during class,
- continually talking with your neighbor when we are not working on a group activity,
- working on homework from another class,
- reading material or watching media on a mobile device not related to this course or at a time that is inappropriate,
- refusing to participate in the class activities.

Support!

If you have a documented disability, the Equal Access Services office will provide me with a letter outlining your accommodations. I will then discuss the accommodations with you to determine the best learning environment. If you feel that you need accommodations, but have not documented your disability, please contact Cheryl Dilger, the coordinator for Equal Access Services at 925-8910 or cdilger@unm.edu.

If you are struggling in this course, do not be afraid to ask for help!

- Office Hours: See my office hours listed at the beginning of this syllabus. “Office Hours” Feel free to come by or log in for online office hours, or make an appointment to get help.
- Form study groups: You may work together with other members of our class on Canvas discussion board.
- Free Tutoring: The Math Center at Valencia campus has free tutoring and open labs. Call 505-925-8907 for more information. CAPS on main campus also provides tutoring for which I can get documentation. “LRC”
- Student Services: There are various services provided in our Student Services Department. Read about [Office of Equal Access](#). Also, we have a testing center, advising, and career placement available: Valencia Student Services



Academic Dishonesty

Having academic integrity is paramount to your success in any class. Plagiarism or cheating is not tolerated. Any instance of this will result in a grade of zero for that assignment. Here is the link to the UNM Academic Dishonesty Policy: <https://policy.unm.edu/regents-policies/section-4/4-8.html>. **The policy states:** Each student is expected to maintain the highest standards of honesty and integrity in academic and professional matters. The University reserves the right to take disciplinary action, up to and including dismissal, against any student who is found guilty of academic dishonesty or who otherwise fails to meet the expected standards. Any student judged to have engaged in academic dishonesty in course work may receive a reduced or failing grade for the work in question and/or for the course.

Academic Dishonesty is defined as:

“Academic dishonesty“ includes, but is not limited to, dishonesty in quizzes, tests, or assignments; claiming credit for work not done or done by others; hindering the academic work of other students; misrepresenting academic or professional qualifications within or without the University; and nondisclosure or misrepresentation in filling out applications or other University records.

Cheating students will be prosecuted according to University guidelines. Students should get acquainted with their rights and responsibilities as explained in the Student Code of Conduct <https://grad.unm.edu/aire/academic-integrity.html>

UNM Valencia Title IX Representative

Title IX (9) Statement: In an effort to meet obligations under Title IX, UNM faculty, Teaching Assistants, and Graduate Assistants are considered “responsible employees” by the Department of Education (see pg. 15 - <http://www2.ed.gov/about/offices/list/ocr/docs/qa-201404-title-ix.pdf>). This designation requires that any report of gender discrimination which includes sexual harassment, sexual misconduct and sexual violence made to a faculty member, TA, or GA must be reported to the Title IX Coordinator at the Office of Equal Opportunity (oeo.unm.edu). For more information on the campus policy regarding sexual misconduct, see: <https://policy.unm.edu/university-policies/2000/2740.html>

Important Links

Disabilities Policy: Office of Equal Access: Contact the Office of Equal Access at 925-8560 to schedule an appointment. <https://valencia.unm.edu/students/advisement/equal-access-faqs.html>

The Center for Academic Learning: The Learning Center is open Monday – Friday with evening hours Monday – Thursday To schedule an appointment or for additional information call (505)-925-8907 <https://valencia.unm.edu/campus-resources/learning-commons/index.html>

UNM Valencia Registrar’s Office

Contact Registration Office by calling 925-8580 <http://valencia.unm.edu>

UNM Deadlines & Academic Calendar

UNM Deadlines: <https://registrar.unm.edu/semester-deadline-dates/index.html>*And....*

Academic Calendar: <https://hr.unm.edu/calendars>

Day of Schedule subject to change if necessary

First day of semester: August 21st & Last day of semester: Dec 16th

Final Exams: Dec 11th to 16th

Holidays: Labor Day Sep 4th & Fall break Oct 12th-13th & Thanksgiving Nov 23rd-26th

Aug 22 (Videos 00) - Installing Python & Introduction
 Aug 24 (Videos 01)
 Aug 29 (Videos 02) - Basics of coding in Jupyter, Vars, Math operators, reserved words, Boolean
 Aug 31 (Videos 03)
 Sep 05 (Videos 04) - Strings, indexing, modules, packages, methods
 Sep 07 (Videos 05)
 Sep 12 (Videos 06) - Dataset, reading & writing CSV & Txt files
 Sep 14 (Videos 07)
 Sep 19 (Videos 08) - Data processing
 Sep 21 (Videos 09)

Note: Project 01 & Participation Point 01 Due Sep 25th, 11:59 pm

Sep 26 (Videos 10) - Visualization
 Sep 28 (Videos 11)
 Oct 03 (Videos 12) - Visualization & interpreting Histogram
 Oct 05 (Videos 13)
 Oct 10 (Videos 14) - Box plot, the measure of relation between two variables
 Oct 12 (Videos 15)
 Oct 17 (V-Strings) - Strings and Different number sets
 Oct 19 (Sets)

Note: Project 02 & Participation Point 02 Due Oct 23th, 11:59 pm

Oct 24 (Videos 16) -Linear Regression & residual
 Oct 26 (Videos 17)
 Oct 31 (Videos 18) - Linear Regression & Confidence Interval
 Nov 02 (Videos 19)
 Nov 07 (Videos 20) - R^2 , Adj- R^2 , AIC, BIC & Multiple Regression
 Nov 09 (Videos 21)

Note: Project 03 & Participation Point 03 Due Nov 13th, 11:59 pm

Nov 14 (Videos 22) - Steps to classification & detecting outliers
 Nov 16 (Videos 23)
 Nov 21 (Videos 24) - Dealing with outliers in high dimensional dataset
 Nov 23 (Videos 25)
 Nov 28 (Videos 26) - Principal component analysis
 Nov 30 (Videos 27)
 Dec 05 (Videos 28) - Principal component analysis

Note: Project 04 & Participation Point 04 Due Dec 7th, 11:59 pm