Syllabus-Spring 2021

Title of Course-Section:	**Stat 279 - 501 (T:Data science)**
Name of Department:	Mathematic, Engineering, & Computer Science
Instructor:	Andisheh Dadashi, Assistant Prof. of Mathematics
E-Mail:	andisheh@unm.edu
Class Meeting Days/Times:	Remote Schedule: To be announced on Slack
Credit Hours :	3 credit hours
Class Location:	Online (Slack)
Office Location:	Online (Slack)
Office Hours:	Mondays and Wednesdays: 9 am to 12 pm (Online) or by appointment

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 earned her bachelor's degrees in Mathematics and Statistics from a ranked university in her native Iran. After finishing her undergraduate degrees, she studied abroad in India where she earned her first Master's degree in Statistics. She later moved to the USA to pursue a Ph.D. in Statistics at the University of New Mexico (UNM) and in 2016, she was offered a faculty position as a visiting Lecturer II at UNM-Gallup after receiving her second Master's degree in Statistics.
Andisheh is a strong advocate of higher education and is following her mother's footsteps who was also a University professor in Iran. Because STEM education is becoming increasingly interdisciplinary, Andisheh sought to complement her background in mathematics and statistics with computer science and is eager to integrate data science into her curriculum. Andisheh is currently working on a Ph.D. in computer science and her research includes astrobiology and biomedical informatics while concurrently teaching mathematics, statistics, and computer programming at UNM-Valencia.
To know **Andisheh** watch this video Click on this link

** Email **

In subject of your email to me, please mention your course name, number, and section number. For example, the subject of your email to me should be: **Stat 279 - 501**
You must only contact me with your **UNM e-mail**. Check your **UNM email frequently**. You are responsible for missing any announcement I sent via email or Slack. Failure to identify your message with the class number, and not using your UNM email will result in no response at all.

Table of content

Credit hours

This course is a three-credit hours course therefore you should change the credit shown on your UNM schedule.
You must change the credit hours to 3 otherwise I must drop you from the course.
Please, have a look at the following video to change your credit hours to 3.
https://youtu.be/FhBiJxF-_Mk

Syllabus quiz

Please, read this Syllabus thoroughly and take the Syllabus quiz before the due date.
Questions will be based on the information in this syllabus.
You have until the end of the first week of classes to finish the quiz. After the due date, quiz will disappear. Syllabus quiz is timed and you have only one trial. Grade of the Syllabus quiz will be part of your overall grade.

What is Data Science

Data science is an inter-disciplinary 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.

Learning Objectives and Outcomes

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 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, 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.

Course Outline

Book: There are multiple optional textbook 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

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

How to download Python:
Watch the video on installation channel on Slack.

Sign up for Slack

All the course communication will be placed in Slack.
Click on this link and watch the video tutorial I created for you.
Slack is where work flows. It's where the people you need, the information you share, and the tools you use come together to get things done. Slack can replace email, text messaging, and instant messaging for your team, and keep all those communication styles together in one app. With both desktop and mobile versions, Slack can help your team collaborate and coordinate their work no matter where they are — in the field office, at home, or out knocking doors.
Join our Stat 279 Slack group by following the invitation link on UNM Learn's course information page.
To sign up only use your **UNM-Email**.
As soon as you click on the link you will be directed to Slack website and you should enter your UNM-email.
On Slack the display name must be your first name – Last name. Also, please write down and send me your UNM-ID Number in a personal message (Click on my name and you can send me a personal message).
Please, have the app on your phone too so you can receive the notifications on your phone when I post. I may post some extra credit questions on Slack for a short time so if you don't want to miss it please have the notification on.

Messaging & Channels on Slack

When you sign up for Slack, you should be able to find at least one Channel on the left side of your workplace. By clicking the " + " sign you should be able to add the rest of channels to your work place.
• These are 9 Public Channels that all the students have access to, so you can share ideas with your classmate, ask for help, or ask for questions
• Please, be very careful not sharing your project or reports on any Public Channels. Remember your classmates are able to see or download what you are sharing on public channels.
• Please, share your projects and reports with me through a personal message by clicking on my name on the left side of the workplace.
Public Channels: Announcement, datasets, General, installation, jupyter-notebook, projects, syllabus-schedule, video-links, zoom-link.
(Slack instruction for our course)
Download Slack for Mac
Download Slack for windows
Download Slack for ios
Download Slack for android

Instructor's Availability on Slack or Via email

• The best way of contacting me will be on Slack workplace.
• In all cases please, give me 24 hours to 48 hours to reach back to you. (This is how professional setting works)
• I will be available on Slack or via email during the day until 4 pm as long as I am not in the classroom teaching.
• I will not be able to respond to any email or any messages on Slack on Saturday and Sunday.
• Even though sometimes it seems I am online on Slack but I may be working on other tasks so please be patient and give me 24 hours to 48 hours to reach back to you.

Evaluation/Grading Methods

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

4 Projects (Weight varies)	68%
Syllabus quiz	2%
15 Class Participation	15%
15 Class reports	15%

Overall Grade and Letter Grade

Passing grade is 70% or better.
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+	88	89.99	C+	78	79.99
A	93	97.99	B	83	87.99	C	70	77.99
A-	90	92.99	B-	80	82.99	D	60	69.99

Where do you find your grade?
In UNM Learn: My grade tab

Projects

There are a total of 4 projects for this course. Projects are part of your overall grade. I will assign the Project as early as the semester starts so you can have a look at them. Please dedicate a reasonable amount of time ahead of the due date to be able to prepare what you may need.
You must explain the outcome based on your understanding and not copying others' responses. Any plagiarism count as cheating according to the "Academic dishonesty" section. "Academic dishonesty" section.
For each project, you will have almost three weeks starting from the day I begin teaching a topic related to the project. This means as soon as I begin teaching a topic you are assumed to begin working on your project and ask me your questions.

Where do you find the Projects?
I will upload a Jupyter note of your project in the Project Channel of Slack. You can download it on a PC or laptop. Then open ANACONDA and Lunch Jupyter notebook. You will find raw cells (or field boxes) that contain the questions followed by empty field boxes for your answers. The instruction for each question will be clear. Projects' outcome MUST be submitted as a Jupyter note and in the appropriate locations that I create for your answers. Please don't change anything on the jupyter file you download, only answer the questions. You must not delete the questions. Also, you must not add or remove the field boxes I have created for you.
When you finish your project and you're ready to submit your project please change the Jupyter note's name.

Jupyter note's name for your project:
The jupyter note name must contain your first name, last name, and project number. For example, if your name is Hehsidna Ihsadad and you're submitting project number 02, the jupyter file name must be HehsidnaIhsadadProject02.ipynb
Note: If your project doesn't have an appropriate name you will receive zero.

Where do you submit the Projects?
After changing the file name please send the Jupyter note to me on Slack in a personal message. (Don't share your projects in public channels)

Due dates:
Have a look at the "Course Schedule" for more detail
Due dates are due to the change but we try to stay on top of our schedule. Remember please, all the due times are at 8 am! Due dates are very important. After the due date, no project is accepted to be fair to all the students who work very hard.

Participation points and Class reports

Participation points: In each video I will ask you few questions randomly. There can be one, or more questions in each video. You're responsible to watch the entire video and answer the questions by the due dates.
Class reports or class summary: Each week after watching videos you should write a report of what you have learned in those videos. You should point out the main topics and explain what you have learned or what you have had difficulty with. For each Video I expect you to write at least one paragraph (300 words) about the content. This should be in your own language and not copied from anywhere else. This class report (or summary) can contain the notes you have taken while watching the videos. You must submit your report as one pdf file or word document file with an appropriate label and file name.
Class report file name:
The file name must contain your first name, last name, and video's number. For example, if your name is Hehsidna Ihsadad and you're submitting report and participation point for video 02, the report file name must be HehsidnaIhsadadVideo02.pdf or .doc
Note: If your report doesn't have an appropriate name you will receive zero. .

Where to submit the participation points and class reports: Submit both participation points and class reports as one file with an appropriate name as explained above (either pdf or word document).
Send the word document or pdf to me on Slack in a personal message. (Don't share your file in public channels)

Due date: Due dates will be announced in the announcement page. Due dates are due to the change but we try to stay on top of our schedule. Remember please, all the due times are at 8 am!
Due dates are very important. After the due date, no chapter report is accepted to be fair to all the students who work very hard.

How to be successful in this 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 under estimate the time it takes to write and run programs.
This usually has to do with an error, or bug.
Students overload their class schedule.

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!
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.
Skipping a lecture. Note: There are participation points given through iClicker in lecture will have something due every week.
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.

Support!

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 Slack.
• 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 "ARC" equal access Services. Also, we have a testing center, advising, and career placement available: Valencia Student Services

StudentBehavior & CollegialBehavior

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: Click Here!
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 Associate Dean of Student Services. 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.

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: Click Here!
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 Click Here!

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: Click Here!

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.

Disabilities Policy: (ARC)

Contact Equal Access Services at 925-8560 to schedule an appointment.Click Here!

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 Click Here!

UNM Valencia Registrar's Office

Contact Registration Office by calling 925-8580 Click Here!

UNM Deadlines & Academic Calendar

UNM Deadlines: Click Here! .....*And*.... **Academic Calendar:**Click Here!

Library

We have a library at UNM-Valencia. You should already know where the library is.

Stat 279 Schedule Spring 2021 (subject to change if necessary)

Week	Stat 279 Schedule (Material Covered)	Notes
Jan 18	Installing Python, and Introduction	Videos 00 & 01
Jan 25	Basics of coding in Jupyter, Variables, Math operators, reserved words, Boolean & ...	Videos 02 & 03
Feb 01	Strings, indexing, modules, packages, methods & ...	Videos 04 & 05
Feb 08	Dataset, reading & writing CSV & Txt files	Videos 06 & 07
Feb 15	Data processing	Videos 08 & 09
	Project 01 is due on Monday Feb 22^{nd} at or before 8 am	
Feb 22	Visualization	Videos 10 & 11
Mar 01	Visualization & interpreting Histogram	Videos 12 & 13
Mar 08	Box plot, measure of relation between two variables	Videos 14 & 15
Mar 15	Spring Break	
	Project 02 is due on Monday March 22^{nd} at or before 8 am	
Mar 22	Linear Regression & residual	Videos 16 & 17
Mar 29	Linear Regression & Confidence Interval	Videos 18 & 19
Apr 05	R^2, Adj-R^2, AIC, BIC & Multiple Regression	Videos 20 & 21
	Project 03 is due on Monday April 12^{th} at or before 8 am	
Apr 12	Steps to classification & detecting outliers	Videos 22 & 23
Apr 19	Dealing with outliers in high dimensional dataset	Videos 24 & 25
Apr 26	Principal component analysis	Videos 26 & 27
May 03	Principal component analysis	Videos 28
	Project 04 is due on Monday May 10^{th} at or before 8 am	
May 10	Final week	