CPSC380: Introduction to Data Science
Course Syllabus - Spring 2023

Course Information

Section:	19015
Time and Location:	Sci Tech 352, MWF 11:00 - 11:50 AM

Instructor Information

Instructor:	Dr. Dongsheng Che
Office:	SciTech330
Phone:	570-422-2731
Email:	dche@esu.edu
Office Hours:	MWF 9:20 AM - 11:00 AM and by appointment

Course Description

This course is designed to teach students the fundamentals in the field of Data Science. This course covers the basics of programming environment for data analysis, data manipulation (data index, selection, merge, join, aggregation, grouping), data cleaning, and data visualization (2-D plots, 3-D plots). This is a programming intensive course. .

Student Learning Outcomes

By the end of the semester, you will be able to:

- Describe common Python functionality and features used for data science
- Query DataFrame structures for cleaning and processing
- Understand techniques such as lambdas and manipulating csv files
- Create a visualization using matplotlib
- Describe what makes a good or bad visualization
- Identify the functions that are best for particular problems
- Understand best practices for creating basic charts

Textbooks

Required textbook:
`Python Data Science Handbook` by Jake VanderPlas. O'Reilly Media, Inc. ISBN: 9781491912058.

Online textbooks and resources:

- (PY4E) Python for Everybody: Exploring Data in Python 3 by Charles Severance (`https://www.py4e.com/book`)
- (PDS) Python Data Science Handbook `https://github.com/jakevdp/PythonDataScienceHandbook`)
- (PDA) Python for Data Analysis: Data Wrangling with Pandas, NumPy, and IPython by Wes McKinney (`https://www.programmer-books.com/wp-content/uploads/2019/04/Python-for-Data-Analysis-2nd-Edition.pdf` and `https://github.com/wesm/pydata-book`)
- Python (`https://www.python.org`)
- Numpy (`https://numpy.org/`)
- Python Data Analysis Library (`https://pandas.pydata.org/`)
- Matplotlib (`https://matplotlib.org/`)

Resources

- Online Course Mangement System: `https://esu.desire2learn.com/`

Grading Policy

Your grade will be calculated based on programming assignments, and term project. The percentage for each part and final grading scale are shown below:

Item	Percent (%)	Grading Scale
Programs	70	`A: 90.0-100%` `B: 80.0-89.9%`
Term project & Presentation	30	`C: 70.0-79.9%` `D: 60.0-69.9%`
Total	100	`E: 0-59.9%`

No late programming assignments will be accepted unless you have reasonable excuses, family emergency, sick, etc.

University Policies and Procedures

Title IX Statement

East Stroudsburg University and its faculty are committed to assuring a safe and productive educational environment for all students. In order to meet this commitment and to comply with Title IX of the Education Amendments of 1972 and guidance from the Office for Civil Rights, the University requires faculty members to report incidents of sexual violence shared by students to the University's Title IX Coordinator. The only exceptions to the faculty member's reporting obligation are when incidents of sexual violence are communicated by

a student during a classroom discussion, in a writing assignment for a class, or as part of a University–approved research project. Faculty members are obligated to report to the person designated in the University protection of minors policy any sexual violence or any other abuse of a student who was, or is, a child (a person under 18 years of age) when the abuse allegedly occurred. Information regarding the reporting of sexual violence and the resources that are available to victims of sexual violence is set forth at: Title IX: Sexual Harassment and Sexual Violence. See `http://www4.esu.edu/titleix/`

ESU Diversity, Equity and Inclusion Statement (DEI)

East Stroudsburg University recognizes that achieving academic and inclusive excellence requires challenging bias with a focus on equity. ESU is committed to creating a supportive campus climate where all members of the ESU community feel a sense of responsibility to grow and contribute positively to a just, global and diverse society. See
`https://www.esu.edu/about/history_beliefs/diversity-equity-inclusion.cfm`

ESU's DEI Statement was created to be a foundational recognition of the institutional commitment to diversity, equity, inclusion, and social justice. This statement sets a campus-wide purposeful tone for how ESU will navigate issues related DEI and continue its growth and development in this area.

ESU has a variety of resources available for our students who need support or want to engage in activities to promote diversity, equity, and inclusion on campus. We encourage students to utilize the resources available through departments such as the Center of Multicultural Affairs and Inclusive Education, the Gender and Sexuality Center, OASIS, and the Veterans Center. For more information, contact the Office of Campus Life and Inclusive Excellence via Phone: 570-422-3463 or Email: DEI@esu.edu.

East Stroudsburg University of Pennsylvania does not discriminate on the basis of race, color, national origin, religion, sex, disability, age, sexual orientation, gender identity or veteran's status in its programs and activities in accordance with applicable federal (Titles VI, VII and IX of Civil Rights Act) and state laws (43 P.S §. 953) and regulations. For more information, visit `https://www.esu.edu/about/notices.cfm`.

It is everyone's responsibility to create an environment where we all feel safe and welcome at ESU. If you experience or witness a bias incident, discrimination or harassment, you are encouraged to complete an incident report. For more information or submit a report visit `https://www.esu.edu/diversity/community-restoration-team.cfm`.

Accommodation Statement

Accessibility and Accommodations "Students who need accommodations for a disability may consult with the Office of Accessible Services Individualized for Students (OASIS) on campus at 570-422-3954 to request reasonable accommodations. For students who have

(already/previously) received accommodations, it is the student's responsibility to give reasonable notice in a timely manner to the professor prior to requesting an accommodation."

Academic Integrity

It is expected that students will embrace and practice the principles of academic honesty and integrity (see p. 49 in the ESU Student Handbook, 2020-2021 for academic misconduct violations). Appropriate discussion is encouraged, but cheating and plagiarism will result in an E (failing grade) for the test or assignment and the possibility of more severe penalties based upon proceedings facilitated by the ESU Office of Student Conduct and Community Standards. For additional information about the requirements and consequences involved, contact the Office of Student Conduct and Community Standards at `https://www.esu.edu/student_conduct` or at 570-422-3461.

Tentative Class Schedule

While I will try to stick with this schedule, it could be changed due to learning needs, emergencies or other conditions that may arise.

Week	Date	Topic	Activity	Reading
1	01/16	Introduction of Jupyter Notebook Python Basics	Program 1	PY4E: Ch1-6
2	01/23	Python Data Structures Python Containers		PY4E: Ch8-10
3	01/30	Python OOP Python Advanced Topics	Program 2	PY4E: Ch11,14
4	02/06	Basics of Numpy		PDS: Ch2
5	02/13	Numpy functions Broadcasting	Program 3	PDS: Ch2
6	02/20	Pandas Objects	Program 4	PDS: Ch3
7	02/27	Data Loading, Storage Data Cleaning and Preparation		PDS: Ch3
8	03/06	**Spring break, no classes!**		
9	03/13	Data Wrangling: Join, Combine Data Aggr. and Group Ops.	Program 5	PDS: Ch3
10	03/20	Matplotlib API Primer	Project Proposal	PDS: Ch4
11	03/27	Plotting with pandas and seaborn Other Python Visualization Tools	Program 6	PDS: Ch4
12	04/03	Machine Learning Scikit-Learn	Program 7	PDS: Ch5
13	04/10	Time Series		PDA: Ch11
14	04/17	Data Analysis Examples		PDA: Ch14
15	04/24	Project Presentations		