

CSC 523 – Advanced Scripting for Data Manipulation, Analysis, and Machine Learning
Fall 2020 First Day Handout

Mon 6-8:50 PM, Zoom classes & recordings, <http://faculty.kutztown.edu/parson>

Class-time Zoom for CSC523: See D2L Course CSC523 -> Content -> Overview for the link.

IF you don't want to be recorded or are a minor, use PRIVATE ZOOM CHAT to me for questions.

Dr. Dale E. Parson, parson@kutztown.edu, **Office hours:** <https://kutztown.zoom.us/j/94322223872>

Office Hours Monday 1-2, Tuesday 3:30-4:30, Wednesday 12-2, Thursday 3:30-4:30 or by appt.

This course covers advanced study and practice in using a modern scripting language to integrate off-the-shelf code libraries for the retrieval of unstructured and partially structured data, and for the cleaning, integration, formatting, storage, analysis, and visualization of large data sets. Modern scripting languages include powerful built-in features for storing, retrieving, mapping, and integrating data; code libraries extend such features greatly. Libraries include those for regular-expression based extraction of textual data, data integration, statistical analysis and correlation, machine learning, natural language processing, machine vision and listening visualization, and storage in files and database systems. Emphasis is on using a scripting language to glue together off-the-shelf library modules without writing the complex, underlying library code.

Optional Textbooks: *Hands-On Machine Learning with Scikit-Learn, Keras, and TensorFlow*, Aurélien Géron, 978-1492032649; (super optional: *Python for Data Analysis*, Wes McKinney, 978-1491957660)

Grading (A = 92:100, A- = 90:91, B+ = 87:89, B = 82:86, B- = 80:81, C+ = 77:79, C = 70:76,

D = 60:69, F = 0:59) There is no “D” grade for student grading in 400- and 500-level courses at KU.

Projects 100% divided equally among the project assignments.

Final one or two projects are student presentations and materials for an individual student project.

Programming project assignment grading criteria

Grading rubrics will be part of each assignment handout. Late penalty is 10% per each day late, up until I go over the solution. Any assignment turned in after that is worth 0%.

We will use the CS&IT documentation requirements:

<http://faculty.kutztown.edu/parson/CSCDocumentationStandards.pdf>

The academic integrity policy:

<http://faculty.kutztown.edu/parson/AcademicIntegrityPolicy.pdf>

Please read the above policy statement.

You may openly discuss ideas, algorithms, pitfalls, and the use of programming tools.

You may not share code, test drivers or test data except within groups for group projects.

Group projects, when assigned, have documented partitioning of student responsibilities.

There will be a 10% per day late penalty for projects that come in after the due date.

Class attendance is not graded, but I will be teaching using data sources and concepts both inside and outside the scope of the textbook. You are responsible for all material covered in class, including technical information, coding standards and conventions, verbal specification of assignments, and your questions about topics that are not clear to you. Please, there should be no classroom conversations, cell phones, text messaging, eating, sleeping, obscenities, listening to music or other disruptions of the class.

If you have already disclosed a disability to the Disability Services Office (215 Stratton Administration Building) and are seeking accommodations, please feel free to speak with me privately so that I may assist you. If you have an injury sustained during military service including PTSD or TBI, you are also eligible for accommodations under the ADA and should contact the Disability Services Office.

Please let me know if I pronounce your name incorrectly, or use an incorrect gender pronoun, or if you prefer a nickname or a name different from that in the MyKU roster. Feel free to let me know in private.

Week	Lecture Topics ¹
1	Intro to the course, Zoom. Interactive Python 3 ² . Makefile-driven testing.
2	Regular expressions ³ for extracting, cleaning, and formatting data.
3	Assignment 1 using Python regular expressions.
4	Scikit ⁴ classification, decision trees, Kappa statistic, measures of error.
5	Assignment 2 for classification of discrete target attributes (dependent variables).
6	Regression, model trees. Correlation coefficient & other measures of error.
7	Assignment 3 using regression to predict numeric target attribute values.
8	Bayesian techniques in scikit-learn.
9	Scripted invocation of Weka using bash and Python scripts.
10	Assignment 4 invoking Weka in command-line mode from scripts.
11	Instance-based learning & ensemble learning in sci-kit.
12	Clustering in sci-kit. Start of individual Assignment 5 project.
13	Overview of neural nets for signal-based learning. Consolidation.
14	Student presentations of individual projects.
15	Student presentations of individual projects.

KU Campus Mask policy: Resident students must wear a mask anytime they are outside of their personal room and within a building or with anyone else but their roommate. Commuter students must wear a mask anytime they are on campus within a building or with anyone. The course is 100% via Zoom at class time. I will record & post class videos, but want you there at class time.

PA: The Secretary's Order requires individuals to wear a face covering, in both indoor public places and in the outdoors when they are not able to consistently maintain social distancing from individuals who are not members of their household, such as on a busy sidewalk, waiting in line to enter a place, or near others at any place people are congregating. Whether inside in a public place or outside, and when wearing a face covering or not, everyone should socially distance at least 6 feet apart from others who are not part of your household.

¹ This is a draft schedule that will need revision as we go along. We are proving in the first offering of this course.

² <https://ipython.org/>, <https://www.python.org/> We use Python 3.x.

³ <https://docs.python.org/3/library/re.html>, <https://pythex.org/>

⁴ <https://scikit-learn.org/stable/>