



Wentworth Institute of Technology

College of Engineering and Computer Science

Data Science Fundamentals

Fall 2019

Course Number: COMP-3125

Instructor Name: Mehmet Ergezer

Class Site: <https://jupyter.cs.wit.edu>

Office Hours: Fri 12:00 – 1:00 pm and By Appointment

Class Discussions: <https://piazza.com/wit/fall2019/comp3125>

Office Location: Dobbs 138

Lecture/Lab/Total Credits: 3/2/4

Office Telephone Number: (617) 989-4760

Email address: ergezerm@wit.edu

COURSE DESCRIPTION

The aim of this course is to provide the fundamental knowledge and skills commonly required to solve data-driven problems. The course introduces computational and inferential approaches using set off skills that are cross-disciplinary. The course will train well-rounded professionals who can provide quantitative analysis, gather and analyze (big) data, and interpret and share results in a meaningful way.

COURSE PREREQUISITES/COREQUISITES

([COMP1000](#) or [ELEC3150](#)) and ([MATH1030](#) or [MATH2100](#))

REQUIRED TEXTBOOK(S)

[Online] VanderPlas, J. (2016). *Python data science handbook: essential tools for working with data*. O'Reilly Media, Inc.

THE COLLEGE BOOKSTORE

Location: 103 Ward Street Boston MA 02115

Telephone: 617-445-8814

RECOMMENDED LEARNING MATERIALS

[Optional] Cleveland, W. S. (1993). *Visualizing data (Vol. 2)*. Hobart Press.

COURSE LEARNING OUTCOMES

At the completion of this course, students should be able to:

- Efficiently use the computational language Python and an environment such as Jupyter Notebooks
- Represent data using arrays and utilize computationally efficient libraries, such as NumPy that offer masking, fancy indexing and broadcasting
- Organize less-structured data, munge missing data and work with time-series data using specialized libraries, such as Pandas
- Visualize data with line plots and histograms using Matplotlib and similar packages
- Introduce principal concepts of machine learning to infer from processed data using high-level APIs, such as Scikit-Learn
- Be aware of ethical consequences of automated decision-making

INSTRUCTIONAL METHODOLOGIES

This course explores interactive lecturing via Jupyter Notebooks with hands-on assignments that reinforce the lecture material. In particular, lectures will focus on concepts and ideas while the assignments will provide concrete experience and skills.

ATTENDANCE POLICY

Students are expected to attend classes regularly, take tests, and submit papers and other work at the times specified by the instructor. Students who are absent repeatedly from class or labs will be evaluated by faculty responsible for the course to ascertain their ability to achieve the course objectives and to continue in the course. Instructors may include, as part of the semester's grades, marks for the quality and quantity of the student's participation in class.

GRADING POLICY

There will be approximately five programming assignments during the semester. Assignments will involve writing, testing, and documenting programs as well as visualizing results and explaining the outcome. Each assignment will include a detailed description of the problems and expectations for successful completion. Most assignments will require usage of Jupyter Notebooks.

There will be approximately three quizzes/exams during the semester. There is no final exam for this course. Rather, students will complete a final project that will consist of using an algorithm to make predictions on data. The project assignment will include a detailed description of the project expectations for successful completion. The requirement will be announced in the class.

Student grades are based upon the following criteria:

In-class Quizzes/Exams	30%
Final Project	30%
Homework/Labs	35%
Professionalism	5%

WENTWORTH GRADING SYSTEM

Grade	Weight	Numerical Definition	Definition
A	4	93-100	Student learning and accomplishment far exceeds published objectives for the course/test/assignment and student work is distinguished consistently by its high level of competency and/or innovation.
A-	3.67	90-92	
B+	3.33	87-89	Student learning and accomplishment goes beyond what is expected in the published objectives for the course/test/assignment and student work is frequently characterized by its special depth of understanding, development, and/or innovative experimentation.
B	3	83-86	
B-	2.67	80-82	
C+	2.33	77-79	Student learning and accomplishment meets all published objectives for the course/test/assignment and student work demonstrates the expected level of understanding and application of concepts introduced.
C	2	73-76	
C-	1.67	70-72	
D+	1.33	67-69	Student learning and accomplishment based on the published objectives for the course/test/assignment were met with minimum passing achievement.
D	1	60-66	
F	0	0-59	Student learning and accomplishment based on the published objectives for the course/test/assignment were not sufficiently addressed or met.

ADD/DROP

Students should check the academic calendar to confirm the add/drop deadline. Dropping and/or adding courses is done online. Courses dropped in this period are removed from the student's record.

Non-attendance does not constitute dropping a course. If a student has registered for a course and subsequently withdraws or receives a failing grade in its prerequisite, **then the student must drop that course.** In some cases, the student will be dropped from that course by the Registrar. However, it is the student's responsibility to make sure that he or she meets the course prerequisites and to drop a course if the student has not successfully completed the prerequisite. The student must see his or her academic advisor or academic department chair for schedule revision and to discuss the impact of the failed or withdrawn course on the student's degree status.

MAKE-UP POLICY

Due to the nature of this project-based course, all submissions and presentations must be completed on time. Any late deliverables will be assigned a grade of zero.

ACADEMIC SUPPORT

The Center for Academic Excellence facilitates Wentworth students' academic success and helps them to achieve their full learning potential. Students may choose to receive individual assistance through one-on-one tutoring in many subjects, including math, science, writing, and major classes. In addition, the Center for Academic Excellence offers Facilitated Study Groups (FSGs), tutor-led study tables, academic workshops, and learning-strategy consultations. The peer-tutoring program is certified by the College Reading and Learning Association's International Tutor Training Certification program. To make an appointment or to review our drop-in offerings, please visit www.wit.edu/cae. For additional assistance or support on subjects not listed, please reach out via email at cae@wit.edu.

ACADEMIC HONESTY STATEMENT

Students at Wentworth are expected to be honest and forthright in their academic endeavors. Academic dishonesty includes but is not limited to cheating, prohibited collaboration, coercion, inventing false information or citations, plagiarism, tampering with computers, destroying other people's coursework or lab or studio property, theft of course materials, posting coursework/course materials to websites, or other academic misconduct. If you have any questions, contact your professor prior to submitting an assignment for evaluation. See your academic catalogue for a full list of definitions and the WIT Academic Honesty website for the procedures: wit.edu/academic-honesty.

STUDENT ACCOUNTABILITY STATEMENT

Behavior unbecoming a student is any violation of a published Wentworth policy in an academic environment, and/or any behavior that individual faculty or staff determines is unacceptable in his or her classroom, laboratory, or other academic area or function. Behavior unbecoming a student in an academic environment will not be tolerated. Violations of behavioral expectations may be forwarded to the Office of Community Standards for disciplinary action.

Wentworth takes violations of academic dishonesty and misconduct very seriously. Sanctions for such violations include, but are not limited to, a grade of "F", removal from a course, Institute suspension, or Institute expulsion.

THE CENTER FOR WELLNESS

College can be challenging and it is common to feel overwhelmed or stressed at times. If these feelings are related to course work or academic performance, please talk to me. For more significant mental health concerns, **The Center for Wellness (003 Watson Hall, 617-989-4390)** provides free and confidential mental health counseling.

If you or someone you know needs support around thoughts of suicide, the following resources are available:

- The Center for Wellness, Watson 003, 617-989-4390, M-F 8:15-4:45
- Campus Police, First level of 610 Huntington Avenue, 617-989-4444, 24/7
- Samaritans, call or text 1-877-870-4673
- Crisis Text Line, text "start" to 741-741
- National Suicide Prevention Lifeline, call 1-800-273-8255
- GLBT Youth Hotline, call 1-866-488-7386
- Beth Israel Deaconess Emergency Room, 190 Pilgrim Rd Boston, MA

Students requiring academic accommodations must provide an official accommodation memo from **The Center for Wellness** and contact me privately to discuss logistics.

COLLEGE OF THE FENWAY STUDENTS

If you are enrolled in this course through COF Cross Registration, notify your course instructor. Please provide her/him with your email address to be sure that you receive course information in a timely way. You should also discuss how to access online applications that might be used in the course.

SYLLABUS OUTLINE

A tentative schedule is provided below. The schedule is subject to change as the semester progresses.

Week	Topic	Assignments Due
1	Introduction to Python/Jupyter	
2	Computational programming using Python	
3	Computational programming using Python	PA1
4	NumPy	
5	NumPy	PA2
6	Pandas	Quiz 1
7	Pandas	PA3 [Midterm grades]
8	Visualization with Matplotlib	
9	Visualization with Matplotlib	Quiz 2
10	Machine Learning using Scikit	
11	Machine Learning using Scikit	
12	AI: Supervised Learning	PA4
13	Ethics	[Thanksgiving]
14	Final Project	Quiz 3
15	Final Project	<i>Final Project due</i>