

# University of Wisconsin – Madison

## Syllabus: Econ 690 [Fall 2018], Data Analytics for economists

Meeting: Mondays and Wednesdays, 4:00PM-5:15PM @ Biochemistry 1120

Instructional mode: all face to face

	Professor	Teaching assistant
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Office hours:	TBD	TBD

The modern world generates massive amounts of data. The New York Stock Exchange creates more than one terabyte of data per trading day. Large retailers (think Walmart or Amazon) generate more than one million transactions per hour. The world's governments collect import and export data on over 5,000 types of goods everyday. The World Bank warehouses thousands of economic and development indicators for hundreds of countries spanning decades...and it's not just business and economic data: social media, major league sports, and the health care industry both generate and use data extensively.

The data are out there. The question is: What do they tell us?

This course is an introduction to modern data analysis. Our tool of choice is Python—a programming language widely used in business, finance, and academics—and a suite of packages that provide data management and extensive statistical and graphical capabilities. Programming experience **is not a prerequisite**: Learning Python is part of the course.

This is a hands-on course. Bring your laptop: We will be working with real data and writing programs in the class room.

When you have finished the course, you will be able to transform data into usable forms, compute insightful summary statistics, and create useful—and beautiful—visualizations. Most importantly, your visualizations and analysis will provide data-driven answers to relevant questions. This set of skills will make you more productive (i.e., more valuable) no matter what your future holds.

### Learning outcomes

Upon course completion, students will be able to:

1. Understand basic Python data structures, functions, and syntax.
2. Import data sets from various formats and transform them into usable data structures.
3. Compute descriptive statistics and linear regression models in Python.
4. Create informative and professional-looking figures.

### Course attributes

Counts as Liberal Arts and Science credit in L&S; Counts toward 50% graduate coursework requirement; Advanced

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## Requisites

ECON 410 and (ECON 301 or 311); or ECON 704

## Course materials

1. The course web site (<http://kimjruhl.com/data-analysis>) is the central clearing house for everything related to the course. Here you will find a week-by-week schedule.
2. We will use the book *Python for Data Analysis* (Second edition) by Wes McKinney. It is more book than we will need, but it is a good reference.

## Technology

1. You are required to bring a laptop to each class. We will be writing and debugging code together. Make sure that you can connect to the campus wifi network.
2. We will be using the Social Science Computing Cooperative's *winstat* environment to provide a Python installation. You will receive an email with a user name and logon information for *winstat* shortly before the beginning of the semester.

## Number of credits and how credit hours are met by the Course

This three-credit course has two 75 min lectures per week. Students are expected to work approximately 6 hours per week outside of class to complete assignments and learn the relevant material.

## Deliverables and grades

Your final grade is made up of

1. Five *coding practice* assignments. Each assignment is scored as a “check minus,” a “check,” or a “check plus.” I drop the lowest assignment and each of the remaining assignments is worth one percentage point in your final grade. Scores of “check” or “check plus” receive the full one percent. Scores of “check minus” receive no credit.
2. Two take-home exams.
3. A final project. The final project is a chance for you to develop a piece of data analysis that showcases the tools you have learned in class. The project deliverables are 1) a professional report of no more than three pages that presents the results of your analysis as you would to a client or coworker who is interested in the results, but not necessarily the technical work behind it; and 2) a well-documented Jupyter notebook which lays out the technical details of your analysis. We will discuss the project in much more detail during class.

	Weight in final grade
Best four coding practices	4%
Exam 1	20%
Exam 2	20%
Project proposal	6%
Project	50%

Note that attendance and participation are not part of your final grade. Due dates are posted on the course website. **Late assignments will not be accepted.**

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## **Economics Career Development Office**

If you are interested in learning more about careers related to this course or careers for economics majors, you are encouraged to contact the Economics Career Development Office. This office is staffed by economics-specific career advisors who can help you throughout the job/internship exploration and application process. To learn more or make an appointment, visit their website: <http://econ.wisc.edu/careers>.

### **Misconduct statement**

Academic Integrity is critical to maintaining fair and knowledge based learning at UW Madison. Academic dishonesty is a serious violation: it undermines the bonds of trust and honesty between members of our academic community, degrades the value of your degree and defrauds those who may eventually depend upon your knowledge and integrity.

Examples of academic misconduct include, but are not limited to: cheating on an examination (copying from another student's paper, referring to materials on the exam other than those explicitly permitted, continuing to work on an exam after the time has expired, turning in an exam for regrading after making changes to the exam), copying the homework of someone else, submitting for credit work done by someone else, stealing examinations or course materials, tampering with the grade records or with another student's work, or knowingly and intentionally assisting another student in any of the above. Students are reminded that online sources, including anonymous or unattributed ones like Wikipedia, still need to be cited like any other source; and copying from any source without attribution is considered plagiarism.

The Department of Economics will deal with these offenses harshly following UWS14 procedures:

1. The penalty for misconduct in most cases will be removal from the course and a failing grade,
2. The department will inform the Dean of Students as required and additional sanctions may be applied.
3. The department will keep an internal record of misconduct incidents. This information will be made available to teaching faculty writing recommendation letters and to admission offices of the School of Business and Engineering.

If you think you see incidents of misconduct, you should tell your instructor about them, in which case they will take appropriate action and protect your identity. You can also choose to contact our department administrator, Tammy Herbst-Koel ([therbst@wisc.edu](mailto:therbst@wisc.edu)), and your identity will be kept confidential.

For more information, refer to <https://www.students.wisc.edu/doso/academic-integrity>

### **Grievance procedure statement**

The Department of Economics has developed a grievance procedure through which you may register comments or complaints about a course, an instructor, or a teaching assistant. The Department continues to provide a course evaluation each semester in every class. If you wish to make anonymous complaints to an instructor or teaching assistant, the appropriate vehicle is the course evaluation. If you have a disagreement with an instructor or a teaching assistant, we strongly encourage you to try to resolve the dispute with him or her directly. The grievance procedure is designed for situations where neither of these channels is appropriate.

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If you wish to file a grievance, you should go to room 7238 Social Science and request a Course Comment Sheet. When completing the comment sheet, you will need to provide a detailed statement that describes what aspects of the course you find unsatisfactory. You will need to sign the sheet and provide your student identification number, your address, and a phone where you can be reached. The Department plans to investigate comments fully and will respond in writing to complaints. Your name, address, phone number, and student ID number will not be revealed to the instructor or teaching assistant involved and will be treated as confidential. The Department needs this information, because it may become necessary for a commenting student to have a meeting with the department chair or a nominee to gather additional information. A name and address are necessary for providing a written response.

### **Accommodations for students with disabilities**

McBurney Disability Resource Center syllabus statement: “The University of Wisconsin-Madison supports the right of all enrolled students to a full and equal educational opportunity. The Americans with Disabilities Act (ADA), Wisconsin State Statute (36.12), and UW-Madison policy (Faculty Document 1071) require that students with disabilities be reasonably accommodated in instruction and campus life. Reasonable accommodations for students with disabilities is a shared faculty and student responsibility. Students are expected to inform faculty [me] of their need for instructional accommodations by the end of the third week of the semester, or as soon as possible after a disability has been incurred or recognized. Faculty [I], will work either directly with the student [you] or in coordination with the McBurney Center to identify and provide reasonable instructional accommodations. Disability information, including instructional accommodations as part of a student’s educational record, is confidential and protected under FERPA.” <http://mcburney.wisc.edu/facstaffother/faculty/syllabus.php>

### **Diversity and inclusion**

Institutional statement on diversity: “Diversity is a source of strength, creativity, and innovation for UW-Madison. We value the contributions of each person and respect the profound ways their identity, culture, background, experience, status, abilities, and opinion enrich the university community. We commit ourselves to the pursuit of excellence in teaching, research, outreach, and diversity as inextricably linked goals.

The University of Wisconsin-Madison fulfills its public mission by creating a welcoming and inclusive community for people from every background – people who as students, faculty, and staff serve Wisconsin and the world.” [<https://diversity.wisc.edu>]