Department of Economics
Faculty of Arts

UNIVERSITY OF CALGARY

Economics 411 (L01) Computational and Data Methods in Economics

Instructor:	Ben Crost	Lecture Location:	ES 54
Phone:	(403) 220-4628	Lecture Days/Time:	MWF 11:00 – 11.50
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Office:	SS 416		
Office Hours:	MW 13:00 – 14:00	Fall 2023	

Course Description:
The purpose of this course is to advance students understanding of procedural programming for economics, providing them with a strong foundation to carry through with further study in econometrics and learn the skills sought after in the business community. By the end of the class, students will have extensive experience in developing procedural programs in Python, including ones for automated data acquisition and management. Students will learn how to develop a simple web-scraping algorithm that collects text data from the internet and uses it for sentiment analysis.

Course Learning Outcomes:
Develop and execute python procedural programs that use functions, variables, strings, and lists. Write and run python procedural programs that manage and interact with data. Understand and utilize version control software. Understand the basics of web-scraping and automated text analysis. Design and implement a web-scraping algorithm using procedural Python code.

Course Outline:

1. **Input, Processing, Output:** Understand the basic structure and functioning of procedural computer code. Understand the role of variables and the "state of the program." Write simple programs that take an input and transform it into an output.

2. **Decision Structures and Boolean Logic:** Learn how to use relational operators and Boolean variables. Manage the flow of a computer program using *if*, *if-else*, and *if-elif-else* statements.

3. **Repetition Structures –** Learn how to use *for* loops and *while* loops**.** Use loops for input validation and to calculate running totals.

4. **Functions** – Learn how to modularize programs with functions. Pass arguments to functions and use their return values. Understand the difference between local and global variables (scope of a variable).

5. **Lists –** Learn how to store and manipulate data in a list (or array). Understand indexing to locate items in a list. Iterate over a list, search for items in a list, calculate the sum and average of items in a list.

6. **Working with Strings –** Learn how to use text as data with string variables. Use indexing, concatenation and slicing to manipulate strings. Learn how to extract patterned data from strings with regular expressions.

7. **Dictionaries and Sets** – Learn how to use dictionaries to store and manipulate structured data as key-value pairs. Use sets to store data values as unique elements. Perform common set operations like union, intersection, and difference.

8. **Working with Files –** Understand how files are created and stored in computer memory. Learn how to list files in a directory, work with filenames, and move and organize files. Learn how to read text from a text file, process that text using string operations, and write output to another text file.

9. **Automated Data Acquisition** – Introduction to HTML. Web-scraping with Beautiful Soup.

10. **Data Management and Analysis** – Introduction to simple data operations with Pandas. Learn how to automatically merge datasets on one or more variables. Produce summary statistics and perform OLS regressions. Produce graphical representations of regression results with Matplotlib.

Prerequisites/Corequisites: Econ 311, 357, 359 and 395

Required Textbook(s): Gaddis, *Starting Out with Python*: Pearson.

Recommended Textbook(s):

Sweigart, *Automate the Boring Stuff with Python*. https://automatetheboringstuff.com/

Lutz, *Learning Python, 5th Edition*: O'Reilly.

McKinney, *Python for Data Analysis, 2nd Edition*: O'Reilly.

Required Access to Technology:
Students will need access to a computer that runs Python.

Desire2Learn:
This course will make use of the Desire2Learn (D2L) platform. Students who are registered in the course can log on at http://d2l.ucalgary.ca through their student centre. Please note that D2L features a class e-mail list that may be used to distribute course-related information. These e-mails go to your University of Calgary e-mail addresses only.

Grade Determination:

Midterm Exam	40%
Coding Assignments	10%
Final Exam	50%
	100%

Examination Details:

Tests and exams will not involve multiple choice questions.

Programmable calculators, cellphones, textbooks, course notes, and other electronic devices will not be allowed during the writing of tests or final examinations. Students are reminded that simply being able to access their cellphone during an exam is academic misconduct.

The exact date for the in-class midterm will be announced at least one week in advance.

Grading Policies:

The official grading system will be used. See http://www.ucalgary.ca/pubs/calendar/current/f-1-1.html.

Students must receive a passing grade on the final exam to pass the course. Students committing academic misconduct during the final exam will not receive a passing grade for the course.

If a student's letter grade on the final exam exceeds their midterm letter grade, the weight of the midterm is transferred to the final exam. The student must have written the midterm or provided supporting documentation for the absence.

As per the Writing Across the Curriculum Statement in the Calendar, writing and grading thereof will be a factor in the evaluation of student work. See https://www.ucalgary.ca/pubs/calendar/current/e-2.html.

THERE WILL BE NO MAKEUP OR DEFERRED QUIZZES/TESTS/EXAMS under any circumstances, nor may the quizzes/tests/exams be written early. Students unable to write the quizzes/tests/exams because of documented illness, family emergency, religious observance, or university-sanctioned event will have the weight shifted to the final examination; otherwise a grade of zero will be assigned.

The final examination will be comprehensive, scheduled by the Registrar, held in a classroom, and last 2 hours. If a student cannot write their final exam on the date assigned by the Registrar's Office, they need to apply for a deferred exam https://www.ucalgary.ca/pubs/calendar/current/g-3-4.html.Under no circumstance will this be accommodated by the Department.

Any student work which remains undistributed after the last day of classes will be available to students through the instructor's office during the instructor's office hours.

Reappraisal of Grades:
For Reappraisal of Graded Term Work, see Calendar I.2
 http://www.ucalgary.ca/pubs/calendar/current/i-2.html

For Reappraisal of Final Grade, see Calendar I.3
http://www.ucalgary.ca/pubs/calendar/current/i-3.html

Academic Misconduct and Intellectual Honesty:
Academic Misconduct refers to student behavior that compromises proper assessment of students' academic activities and includes: cheating; fabrication; falsification; plagiarism; unauthorized assistance; failure to comply with an instructor's expectations regarding conduct required of students completing

academic assessments in their courses; and failure to comply with exam regulations applied by the Registrar.

Statement of Intellectual Honesty, see Calendar K.3
https://www.ucalgary.ca/pubs/calendar/current/k-3.html

Plagiarism and Other Academic Misconduct
https://ucalgary.ca/student-services/student-success/learning/academic-integrity

Academic Accommodations:
Students seeking an accommodation based on disability or medical concerns should contact Student Accessibility Services. SAS will process the request and issue letters of accommodation to instructors. Students who require an accommodation in relation to their coursework based on a protected ground other than disability should communicate this need in writing to their instructor. The full policy on Student Accommodations is available at
https://www.ucalgary.ca/legalservices/sites/default/files/teams/1/Policies-Accommodation-for-Students-with-Disabilities-Procedure.pdf and https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Student-Accommodation-Policy.pdf.

Freedom of Information and Protection of Privacy (FOIP) Act:
Personal information is collected in accordance with FOIP. Assignments can only be returned to the student and will be accessible only to authorized faculty and staff. For more information, see
https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/faq-privacy-faculty-members.pdf and https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/faq-privacy-students.pdf

Internet and Electronic Communication Device Information:
The use of cell phones for any purpose in class is prohibited. Computers and tablets may be used for note taking only unless otherwise authorizes by the instructor.

Copyright Legislation:
See the University of Calgary policy on Acceptable Use of Material Protected by Copyright at
https://www.ucalgary.ca/legal-services/sites/default/files/teams/1/Policies-Acceptable-Use-of-Material-Protected-by-Copyright-Policy.pdf. Students who use material protected by copyright in violation of this policy may be disciplined under the Non-Academic Misconduct Policy.

Recording of Lectures:
Recording of lectures is prohibited, except for audio recordings authorized as an accommodation by SAS or an audio recording for individual private study and only with the written permission of the instructor. Any unauthorized electronic or mechanical recording of lectures, their transcription, copying, or distribution, constitutes academic misconduct. See https://www.ucalgary.ca/pubs/calendar/current/e-6.html.

Instructor Intellectual Property:
Course materials created by instructors (including presentations and posted notes, labs, case studies, assignments and exams) remain the intellectual property of the instructor. These materials may NOT be reproduced, redistributed or copied without the explicit consent of the instructor. The posting of course materials to third party websites such as note-sharing sites without permission is prohibited. Sharing of extracts of these course materials with other students enrolled in the course at the same time may be allowed under fair dealing.

Important Dates:
Please check: http://www.ucalgary.ca/pubs/calendar/current/academic-schedule.html.

Student Organizations:
Faculty of Arts Students' Association (F.A.S.A.):
   Economics Department Representative
   Office: SS 803, E-mail: econrep@fasaucalgary.ca and Web: www.fasaucalgary.ca.

Society of Undergraduates in Economics: https://www.ucalgarysue.com/.

Society of Undergraduates in Economics is a student run organization whose main purpose is to assist undergraduate economics students to succeed both academically and socially at the University of Calgary. Services include access to the exam bank, career events such as Industry Night and information sessions, mentorship programs, and social events for members. They invite you to join by contacting SUE at sue@ucalgarysue.com

Faculty of Arts Program Advising and Student Information Resources:
- Have a question, but not sure where to start? The Arts Students' Centre is your information resource for everything in Arts! Drop in at SS102, call them at 403-220-3580, or email them at artsads@ucalgary.ca. You can also visit the Faculty of Arts website at http://arts.ucalgary.ca/undergraduate, which has detailed information on common academic concerns, including program planning and advice.
- For registration (add/drop/swap), paying fees and assistance with your Student Centre, contact Enrolment Services at 403-210-ROCK [7625] or visit them in the MacKimmie Tower.

Student Support and Resources:
- See https://www.ucalgary.ca/registrar/registration/course-outlines for information on campus mental health resources, the Student Ombuds Office, Student Success Centre, Safewalk, and Emergency Evacuation and Assembly.
- Online writing resources are available at https://ucalgary.ca/student-services/student-success/writing-support.

Notes:
1. Students are responsible for all assigned material, e.g., supplementary material posted on D2L, regardless of whether or not the material was covered in class.

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2023-08-14