Fall 2021 – Introduction to Geospatial Programming – GEOM2005
Department of Geography and Environmental Studies
Carleton University

Academic Year: Fall 2021
Course Title: Introduction to Geospatial Programming
Department: Department of Geography and Environmental Studies
Course number: GEOM 2005
Instructor: Dipto Sarkar (dipto.sarkar@carleton.ca)

I. Course description: Computer programming for geomatics students focusing on storage, manipulation, management, visualization and analysis of geospatial data; Essential coding concepts and best practices including variables, loops, and conditional statements; programmatic handling of raster and vector data structures; and map production; GIS tool customization.

II. Preclusions: None

III. Learning Outcomes: By the end of this course, students will be able to:

- Describe the various scenarios in which using a programming environment for geospatial problems is beneficial overusing GUI based applications
- Explain basic programming concepts such as variables, conditional statements, and loops
- Write computer programs utilizing aforementioned concepts
- Develop programs for geospatial analysis
- Build on concepts to further develop their computer programming skills

IV. Texts:
Reference Books:
1. Python for Everybody by Dr. Charles R. Severance. Available as a PDF, HTML, or to Buy
2. Learn Python the Hard Way by Zed A. Shaw. Available to Buy

V. Course calendar (tentative: dates and topics subject to change):

Week	Topic	Lab Assignment
Sept 8 – Sept 10	Introduction (Thursday 8:30 am) (In person)	Set-up (Own time)
Sept 13 – Sept 17	Variables and Program Breakdown	Getting started with Jupyter
Sept 20 – Sept 24	Conditional Statements	A1: Variables and Program Breakdown
Sept 27 – Oct 1	For Loops	A2: Conditional Statements
Oct 4 – Oct 8	More Data Structures	A3: For Loops
Oct 11 – Oct 15	Functions	A4: Data Structures
Oct 18 – Oct 22	Pandas	A5: Functions

Oct 25 – Oct 29	BREAK	
Nov 1 – Nov 5	Geopandas and RasterIO	A6: Pandas
Nov 8 – Nov 12	Plotting and Object-Oriented Programming	A7: Geopandas
Nov 15 – Nov 19	ArcPy	A7: Geopandas Contd.
Nov 22 – Nov 26	A8: Plotting and OO Lab (Own time)	A8: Plotting and OO Lab Contd.
Nov 29 – Dec 3	Doubts and closing	A9: ArcPy Lab
Dec 6 – Dec 10	A9: ArcPy Lab Contd. (Own time)	NO CLASS

VI. Evaluation:

- o Lab Assignments (90%)
  - ▪ Assignment 1 – 4: 5 points
  - ▪ Assignment 5 – 6: 10 points
  - ▪ Assignment 7: 20 points
  - ▪ Assignment 8 – 9: 15 points
- o MCQ (10%)

Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean.

Late Policy: All submissions are online at cuLearn. No late assignments will be accepted, with the exception of medical issues/illness or if you have already arranged for an academic accommodation as described in subsequent sections of this syllabus. In such cases you must make arrangements with the course instructor at least 24 hours prior to the due date. It is your responsibility to ensure that the instructor or TA receive your submitted hard copies. If you are unable to submit an assignment in cuLearn, it is recommended that you email the instructor or TA with a copy. However, this option should only be considered as a last resort.

Lecture/Lab attendance: This module is delivered in a blended manner. While attendance to synchronous sessions is not recorded, it is highly recommended that you attend all sessions.

VII. Statement on Plagiarism
The University Senate defines plagiarism as "*presenting, whether intentionally or not, the ideas, expression of ideas or work of others as one's own.*" This can include:
- reproducing or paraphrasing portions of someone else's published or unpublished material, regardless of the source, and presenting these as one's own without proper citation or reference to the original source;
- submitting a take-home examination, essay, laboratory report or other assignment written, in whole or in part, by someone else;

- using ideas or direct, verbatim quotations, or paraphrased material, concepts, or ideas without appropriate acknowledgment in any academic assignment;
- using another's data or research findings;
- failing to acknowledge sources through the use of proper citations when using another's works and/or failing to use quotation marks;

Plagiarism is a serious offence that cannot be resolved directly by the course's instructor. The Associate Dean of the Faculty conducts a rigorous investigation, including an interview with the student, when an instructor suspects a piece of work has been plagiarized. Penalties are not trivial. They can include a final grade of "F" for the course.

VIII. Requests for Academic Accommodations
Academic Accommodations/Deferred Assignments Section
Carleton University has suspended the need for a doctor's note or medical certificate until further notice when requesting academic accommodation related to COVID-19. Students should complete the self-declaration form available on the Registrar's Office website to request academic accommodation for missed course work including exams and assignments. Here is the link to the form: ***https://carleton.ca/registrar/wp-content/uploads/self-declaration.pdf***.
For more information about deferrals for final exams/take-home exams please see these websites: ***https://carleton.ca/registrar/deferral/*** and
https://stuapps.carleton.ca/sarms/registrar/deferral. Please note that students may also submit a COVID-19 self-declaration form instead of a medical note for these deferrals.

Students are encouraged to connect directly with their instructors to discuss required accommodations arising from the COVID-19 situation. Equity and Inclusive Communities and Academic Advisors can also be reached if students are unable to reach out to instructors directly.

The Senate has approved the optional conversion of one 0.5 credit passing grade to Satisfactory (SAT) for the Winter 2021 term. SAT/UNS grades are not used in the calculation of CGPA, which means that changes in academic performance due to the current disruption will not affect students' permanent records. More information can be found at:
https://carleton.ca/academicadvising/faqs-about-sat-uns/.

Religious Observation
A request should be made in the first two weeks of the academic term, or as soon as possible where the scheduling of an event or activity conflicting with a religious obligation does not appear in the course outline or calendar. A list of multi-faith holy days is accessible through the ***Equity Services website***. Instructors can also contact Equity Services to confirm the eligibility of a religious event or practice.

Pregnancy and/or Parental Leave
Requests for parental leave must be made in writing to the Registrar's Office, or in the case of graduate students, to the Office of the Dean of Graduate and Postdoctoral Affairs.

A student who is pregnant may request a temporary modification to her program (e.g., laboratory or field work). The student should meet with the instructor(s). The department chair/director

and the faculty dean can assist in the discussion. An Equity Services advisor can also be consulted if a student has questions about pregnancy and/or parental leave.

Students with Disabilities

Carleton is strongly committed to providing access and accommodation for all individuals with identified and duly assessed disabilities. The university has a **Senate-approved policy on academic accommodation** that forms part of its human rights policy. The policy promotes efforts to accommodate students with disabilities so that they will have the opportunity to meet learning outcomes and be fairly evaluated in their performance. In no case, however, does academic accommodation negotiate away, lower, or remove the academic standards and learning outcomes of any course or program, rule, regulation, or policy at the university.

Some students with disabilities may require special accommodations for tests and exams. In these cases, students must present you with a signed accommodation form from the Paul Menton Centre detailing their accommodation needs well in advance of the date of an exam. A copy of the **Paul Menton Centre accommodations policy can be found here**.

Survivors of Sexual Violence

As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and where survivors are supported through academic accommodations as per Carleton's Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit **carleton.ca/sexual-violence-support**.

Accommodation for Student Activities

Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details, see **the policy**.

Contacts

Equity Services	Paul Menton Centre
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equity@carleton.ca	pmc@carleton.ca
carleton.ca/equity	carleton.ca/pmc