

Department of Population Medicine
POPM*6290: Epidemiology III
Fall 2020

Start: September 14, 13:00, remotely delivered

Coordinator: Olaf Berke

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Home office hours: after class or by appointment.

Lecture: Monday 13:00 – 14:20

Wednesday 13:00 – 14:20

Except: Monday Oct 12 (holiday) is rescheduled for Dec 4

Calendar description

This 0.5 credit course provides an overview of advanced methods for the analysis of clustered/correlated epidemiological data. Special emphasis is on spatial, time series, longitudinal and survival data in epidemiology.

Prerequisite(s): [POPM*6210](#) (or equivalent, e.g. graduate course on GLMM's)

General course theme

The general theme of this course is the *modeling of clustered epidemiologic data*. Clustering means that observations are dependent. This dependence is a result of natural grouping of individuals such as: animals in herds, people in families. Clustering can also occur because observations are taken repeatedly over time on the same individuals or repeatedly over space. Therefore, statistical methods for independent data are inappropriate and specialized methods for the analysis of clustered public health data are needed.

This course is an *applied course*. All methods will be discussed and applied to real data using epidemiological and public or animal health case studies and statistical software. The software used in this course is “R”. R was specifically developed for teaching and research, and allows fitting of all models discussed in this course. R is a popular freeware and available for all platforms (Windows, UNIX and MacOS) from the Internet at: <http://probability.ca/cran/>. To avoid any visual differences in the R appearance on the computer (it looks different on a Mac than a Windows machine!) “RStudio” will be used for class demonstrations. RStudio is also freely available from the Internet at: <https://www.rstudio.com/>.

Course topics and references

The course topics are *time series*, *longitudinal* and *spatial data analysis* as well as *survival time analysis*, emphasizing regression modeling of clustered categorical outcomes as usually seen in epidemiology and disease surveillance. A script will be available via CourseLink, which includes detailed examples as discussed in class, but you may also want to read a structured introduction to the use of R. The following texts are online available from the library or the Internet:

Dalgaard P (2008) *Introductory Statistics with R*, 2nd edn. Springer, New York.

Wickham & Golemund (2016) *R for Data Science*. <https://r4ds.had.co.nz/>

Teaching approach

Methods for the analysis of clustered analysis will be introduced and their applications demonstrated using real world data from epidemiology, public health or animal health studies. Case studies are discussed in combined lecture and lab sessions. Students will also explore the methods as part of their homework. General answer keys for the homework will be provided and issues discussed in class. But the expectation is that students do exercises first on their own and later receive individual feedback for work handed to the instructor.

I do my best to provide a safe teaching and learning environment that is based on *respect* for each other. I believe that excellence in statistics and epidemiology is based on *experience*, which comes from applying respective methods in various situations, which reveal their strengths and weaknesses. Furthermore, students should realize that self-*motivation* in graduate school is of utmost importance: all courses (no matter how advanced) will only “open a door” for further studies, more examples and additional methods.

Course Outcomes

Students will have gained an understanding about the use of advanced statistical methods for the analysis of spatial and temporal data in epidemiological research. Students will have developed skills in the application of statistical software to answer typical questions with spatial and temporal epidemiological data. Students will have improved their ability for statistical thinking and reasoning in a public health setting.

Course Evaluations

5 assignments (5x14% = 70%)

Individual term **project** (30%)

Assignments

Assignments throughout the semester and across topics will ensure continuous participation in class. These assignments will come as essays or mini-paper (2 pages) in journal article format. Due dates will be as announced in class.

Term Project

A take-home project covering a specific topic as discussed in class is assigned as an independent study project. Students will search for data and analyze these throughout the semester. The report will be in form of a research paper (max. 10 pages). Progress is discussed at mid-term and end of the semester for feedback. Due date is Dec 7 (at noon).

Audit

To receive an “audit” credit students are asked to write an essay of about 700 to 800 words in length about a topic provided Nov 23 and due on Dec 7 (noon).

Class and room schedule (unfortunately always subject to change)

Session	Date	Topic (tentative)
1.	Mo Sept 14	Spatial Analysis 1
2.	Wed Sept 16	Spatial Analysis 2
3.	Mo Sept 21	Spatial Analysis 3
4.	Wed Sept 23	Spatial Analysis 4
5.	Mo Sept 28	Spatial Analysis 5
6.	Wed Sept 30	Time Series Analysis 1
7.	Mo Oct 5	Time Series Analysis 2
8.	Wed Oct 7	Time Series Analysis 3
	Mo Oct 12	Holiday: no class ☺
9.	Wed Oct 14	Time Series Analysis 4
10.	Mo Oct 19	Time Series Analysis 5
11.	Wed Oct 21	Midterm Wrap-up
12.	Mo Oct 26	Term project discussions
13.	Wed Oct 28	Longitudinal Analysis 1
14.	Mo Nov 2	Longitudinal Analysis 2
15.	Wed Nov 4	Longitudinal Analysis 3
16.	Mo Nov 9	Longitudinal Analysis 4
17.	Wed Nov 11	Longitudinal Analysis 5
18.	Mo Nov 16	Survival Analysis 1
19.	Wed Nov 18	Survival Analysis 2
20.	Mo Nov 23	Survival Analysis 3
21.	Wed Nov 25	Survival Analysis 4
22.	Mo Nov 30	Survival Analysis 5
23.	Wed Dec 2	Final Wrap-up
24.	Fri Dec 4	Term project discussions
	Mon Dec 7	Term Projects / Audit Essays due

CourseLink:

Additional course materials and information regarding all assignments will be posted on the CourseLink website. The website can only be accessed by persons who are registered for the class, therefore it is imperative that students ensure that they are registered for the class and have access to CourseLink. If you have any problems accessing CourseLink, contact CCS at x58888 or 58888help@uoguelph.ca

Email Communication

As per university regulations, all students are required to check their e-mail account regularly: e-mail is the official route of communication between the University and its students.

When You Cannot Meet a Course Requirement

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons please advise the course instructor (or designated person, such as a teaching assistant) in writing, with your name, id#, and e-mail contact. The grounds for Academic Consideration are detailed in the Undergraduate and Graduate Calendars.

Graduate Calendar - Grounds for Academic Consideration:

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Drop Date

Students will have until the last day of classes to drop courses without academic penalty. The deadline to drop two-semester courses will be the last day of classes in the second semester. This applies to all students (undergraduate, graduate and diploma) except for Doctor of Veterinary Medicine and Associate Diploma in Veterinary Technology (conventional and alternative delivery) students. The regulations and procedures for course registration are available in their respective Academic Calendars. Graduate Calendar - Registration Changes:

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/genreg-reg-regchg.shtml>

Copies of Out-of-class Assignments

Keep paper and/or other reliable back-up copies of all out-of-class assignments: you may be asked to resubmit work at any time.

Accessibility

The University promotes the full participation of students who experience disabilities in their academic programs. To that end, the provision of academic accommodation is a shared responsibility between the University and the student. When accommodations are needed, the student is required to first register with Student Accessibility Services (SAS). Documentation to substantiate the existence of a disability is required; however, interim accommodations may be possible while that process is underway. Accommodations are available for both permanent and temporary disabilities. It should be noted that common illnesses such as a cold or the flu do not constitute a disability. Use of the SAS Exam Centre requires students to book their exams at least 7 days in advance and not later than the 40th Class Day. More information can be found on the SAS website:

<https://www.uoguelph.ca/sas>

Academic Integrity

The University of Guelph is committed to upholding the highest standards of academic integrity, and it is the responsibility of all members of the University community-faculty, staff, and students-to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring. University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff, and students have the responsibility of supporting an environment that encourages academic integrity. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection.

Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

Graduate Calendar - Academic Misconduct

<https://www.uoguelph.ca/registrar/calendars/graduate/current/genreg/index.shtml>

Recording of Materials

Presentations that are made in relation to course work - including lectures - cannot be recorded or copied without the permission of the presenter, whether the instructor, a student, or guest lecturer. Material recorded with permission is restricted to use for that course unless further permission is granted.

Resources

The Academic Calendars are the source of information about the University of Guelph's procedures, policies, and regulations that apply to undergraduate, graduate, and diploma programs. Academic Calendars <https://www.uoguelph.ca/academics/calendars>