Department of Epidemiology and Biostatistics

Biostatistics 9631R
Statistical Software
Fall 2023

Course Dates:          Instructor:     Office Hours:    E-mail:
October 25 - December 6 Osvaldo Espin-Garcia  By appointment oespinga@uwo.ca  Ext: 81358
Lecture:              Ngianga-Bakwin Kandala
Wed, 2:30pm-4:30pm, TBA
Lab:                  E-mail:         Ext:
Wed, 4:30pm-5:30pm, TBA nkandala@uwo.ca  86060

Course Description
This course introduces students to the use of both commercial software packages (i.e., SAS
and Stata) and open-source software (R via RStudio) for data management, exploratory data
analysis, and inferential statistical analysis. Examples analyzed using multiple software
packages are used to illustrate the advantages and disadvantages of each package. Students
should have an understanding of statistics at the level of multivariable methods.

Course Information
Prerequisites: Epidemiology 9553B, Biostatistics 9521B or equivalent, or with instructor
approval.

Undergraduate Policy: Unless you have either the requisites for this course or written special
permission from your Dean to enroll in it, you may be removed from this course and it will be
deleted from your record. This decision may not be appealed. You will receive no adjustment to
your fees in the event that you are dropped from a course for failing to have the necessary
prerequisites.

Graduate Policy: Enrollment in this course is restricted to graduate students in the Department
of Epidemiology and Biostatistics, as well as any student that has obtained special permission
to enroll in this course from the course instructor as well as the Graduate Chair (or equivalent)
from the student’s home program.

Course Learning Outcomes/Objectives
Upon successful completion of this course, students will be able to:
(i) understand the principles, advantages, and shortcomings of most commonly used
statistical software;
(ii) process and wrangle data from a variety of sources to carry out analyses of
epidemiological and biomedical studies using the statistical software; and
(iii) interpret and process outputs from each statistical software for statistical analysis
and dissemination of results;
Course Materials


Any Additional materials will be provided on the course’s OWL website.

Methods of Evaluation

- 20% - Attendance
- 80% - Final project (Due on Dec 15)

Course Timeline and Format

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<tr>
<th>Week</th>
<th>Date</th>
<th>Lecture Topic</th>
<th>Readings</th>
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<tbody>
<tr>
<td>1</td>
<td>Oct 25</td>
<td>Introduction to R and RStudio Data input and output in R</td>
<td>Appendix B Chapter 1</td>
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<td>2</td>
<td>Nov 1</td>
<td>Data management in R Statistical and Mathematical functions and common procedures in R</td>
<td>Chapter 2 Chapters 3 and 5</td>
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<td>3</td>
<td>Nov 8</td>
<td>Graphics in R Simulations in R</td>
<td>Chapter 8 Chapter 10</td>
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<td>4</td>
<td>Nov 15</td>
<td>Data management in Stata Statistical and Mathematical functions in Stata</td>
<td>Handout</td>
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<td>5</td>
<td>Nov 22</td>
<td>Common procedures in Stata Simulations in Stata</td>
<td>Handout</td>
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<td>6</td>
<td>Nov 29</td>
<td>Data management in SAS Statistical and Mathematical functions in SAS</td>
<td>Chapter 2 Chapter 3</td>
</tr>
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<td>7</td>
<td>Dec 6</td>
<td>Common procedures in SAS SAS Macros Simulations in SAS</td>
<td>Chapter 5 Chapter 10</td>
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<td>8</td>
<td>Dec 15</td>
<td>Final Project Due</td>
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Western Academic Policies and Statements

Absence from Course Commitments (Undergraduate policy)

A. Absence for medical illness:

Students must familiarize themselves with the Accommodation for Illness Policy.

A student seeking academic accommodation for any work worth less than 10% must contact the instructor or follow the appropriate Department or course specific instructions provided on the course outline. Instructors will use good judgment and ensure fair treatment for all students when considering these requests. You are not required to disclose details about your situation to your instructor; documentation is not required in this situation, and you should not send any pictures to your instructor.

If you are unable to meet a course requirement for any work worth 10% or greater due to illness or other serious circumstances, you must provide valid medical or other supporting documentation to the Academic Counseling as soon as possible and contact your instructor immediately. It is the student's responsibility to make alternative arrangements with their instructor once the accommodation has been approved and the instructor has been informed. Please note that the format of a make-up test, exam, or assignment is at the discretion of the course coordinator.

A student requiring academic accommodation due to illness should use the Student Medical Certificate when visiting an off-campus medical facility or request a Record's Release Form (located in the Dean's Office) for visits to Student Health Services. The form can be found at: http://www.uwo.ca/univsec/pdf/academic_policies/appeals/medicalform.pdf

B. Absence for non-medical reasons:

Student absences might also be approved for non-medical reasons such as religious holidays and compassionate situations. Please review the policy on Accommodation for Religious Holidays. All non-medical requests must be processed by Academic Counselling. Not all absences will be approved; pay attention to the academic calendar and final exam period when booking any trips.

C. Special Examinations

A Special Examination is any examination other than the regular examination, and it may be offered only with the permission of the Dean of the Faculty in which the student is registered, in consultation with the instructor and Department Chair. Permission to write a Special Examination may be given on the basis of compassionate or medical grounds with appropriate supporting documents. To provide an opportunity for students to recover from the circumstances resulting in a Special Examination, the University has implemented Special Examinations dates. These dates as well as other important information about examinations and academic standing can be found here.

Absence from Course Commitments (Graduate policy)

All non-medical absences must be approved in advance. In the case of an unexpected absence on compassionate grounds, documentation may be requested. If documentation is required for either medical or non-medical academic accommodation, then such documentation must be submitted by the student to the instructor.

Statement on Academic Offences

Undergraduate Policy: Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence,
at the following Web site:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

**Graduate Policy:** Scholastic offences are taken seriously and students are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_grad.pdf

**The following policies apply to all students:**
All required papers may be subject to submission for textual similarity review to the commercial plagiarism detection software under license to the University for the detection of plagiarism. All papers submitted for such checking will be included as source documents in the reference database for the purpose of detecting plagiarism of papers subsequently submitted to the system. Use of the service is subject to the licensing agreement, currently between The University of Western Ontario and Turnitin.com (http://www.turnitin.com).

Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

**Copyright and Audio/Video Recording Statement**
Course material produced by faculty is copyrighted and to reproduce this material for any purposes other than your own educational use contravenes Canadian Copyright Laws. You must always ask permission to record another individual and you should never share or distribute recordings.

**Support Services**
As part of a successful student experience at Western, we encourage students to make their health and wellness a priority. Western provides several on campus health-related services to help you achieve optimum health and engage in healthy living while pursuing your degree. For example, to support physical activity, all students, as part of their registration, receive membership in Western’s Campus Recreation Centre. Numerous cultural events are offered throughout the year. Please check out the Faculty of Music web page http://www.music.uwo.ca/, and our own McIntosh Gallery http://www.mcintoshgallery.ca/.

Regisstrarial Services: http://www.registrar.uwo.ca
USC Student Support Services: http://westernusc.ca/services/
Academic Support and Engagement: http://academicsupport.uwo.ca/
SGPS Life & Community web page: https://grad.uwo.ca/life_community/self/index.html

Students seeking help regarding mental health concerns are advised to speak to someone they feel comfortable confiding in, such as their faculty supervisor, their program director (Graduate Chair), or other relevant administrators in their unit. Health and Wellness-related information and services are available at https://www.uwo.ca/health/. Students who are in emotional/mental distress should refer to Mental Health@Western https://www.uwo.ca/health/ for a complete list of options about how to obtain help.

Western is committed to reducing incidents of gender-based and sexual violence and providing compassionate support to anyone who has gone through these traumatic events. If you have experienced sexual or gender-based violence (either recently or in the past), you will find information about support services for survivors, including emergency contacts at https://www.uwo.ca/health/student_support/survivor_support/get-help.html. To connect with a case manager or set up an appointment, please contact support@uwo.ca.
Accessible Education Western (AEW)

Western is committed to achieving barrier-free accessibility for all its members. As part of this commitment, Western provides a variety of services devoted to promoting, advocating, and accommodating persons with disabilities in their respective program.

Students with disabilities (for example, chronic illnesses, mental health conditions, mobility impairments) are strongly encouraged to register with Accessible Education Western (AEW), a confidential service designed to support graduate and undergraduate students through their academic program. With the appropriate documentation, the student will work with both AEW and their programs (normally the Program Chair and/or Course Instructor) to ensure that appropriate academic accommodations to program requirements are arranged. These accommodations include individual counselling, alternative formatted literature, accessible campus transportation, learning strategy instruction, writing exams and assistive technology instruction.

More information and access to services is available on the AEW website: http://academicsupport.uwo.ca/accessible_education/index.html

Department & Faculty Offices

The Department of Epidemiology and Biostatistics is located on the third floor of the Western Centre for Public Health & Family Medicine (PHFM) on Western University’s Main Campus.

Undergraduate Students requiring academic counselling should contact the Science & Basic Medical Sciences Academic Counselling Office: https://www.uwo.ca/sci/counselling/.

Technology Requirements

You are responsible for all required course materials and announcements posted to the course’s OWL website. Please ensure after the first class that when you log in you are able to access the course site. A copy of the course outline will be available on both OWL and the departmental website.

Cell Phone and Electronic Device Policy

The Schulich School of Medicine & Dentistry is committed to ensuring that testing and evaluation are undertaken fairly across all our departments and programs. For all tests and exams, it is the policy of the School and the Department of Epidemiology and Biostatistics that any electronic devices, i.e., cell phones, tablets, cameras, or iPod are strictly prohibited. These devices MUST be left either at home or with the student’s bag/jacket at the front of the room and MUST NOT be at the test/exam desk or in the individual’s pocket. Any student found with one of these prohibited devices will receive a grade of zero on the test or exam. Non-programmable calculators are only allowed when indicated by the instructor. The Department of Epidemiology and Biostatistics is not responsible for stolen/lost or broken devices.