EPIB 613 Introduction to Statistical Software (Fall 2019)

DESCRIPTION: The course is to introduce the statistical software R, a free environment for statistical computing and graphics, to graduate students in the MSc and MScPH degree programs in the Department of Epidemiology and Biostatistics. It can help students to get familiar with basic commands for managing and analyzing data in R. This course provides hands-on experiences of using R with various data formats to cover the basics of data creation and manipulation, graphics, and elementary statistical analysis. By the end of this course, participants should be able to use R for data mining, statistical analyses including descriptive analysis, statistical inference, and reporting.

LOCATION: Education Building, 211 **DAY/TIME**: Thursdays, 2:35 PM-3:55 PM

FORMAT: Approximately 1.5 hours including lectures and hands-on practice each week in the computer lab.

ADMISSIBILITY: This course is open to Epidemiology MSc, MSc Public Health, and PhD (epi) degree students concurrently enrolled in EPIB601.

GRADING: Pass/Fail based on class participation and assignments

ASSIGNMENTS: There will be 3 assignments in total. Each assignment will be a R exercise based on materials covered in class. Assignments should be submitted via myCourses in PDF format by 5 PM on each assignment's due date. All assignments should include your name and assignment number in file name. Late assignments will be penalized by 10% per day unless an extension has been granted by the instructor or in the case of an emergency.

INSTRUCTOR:

Asad Haris, PhD

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Office hours: directly after class or by appointment

TEACHING ASSISTANTS: n/a

Office hours: n/a

Course Schedule and Content

Date	Class	Assignments
5 Sep 2019	**Lecture 1: Introduction to Statistical Software in Epidemiology--R language** -- Basic computations in R -- R Markdown -- Install R Packages	
12 Sep 2019	**Lecture 2: An Overview of R-Part I** -- How to create an object -- Operators -- How to generate data -- Data types -- Introduction to ggformula and mosaic packages	
19 Sep 2019	**Lecture 3: An Overview of R-Part II** --How to deal with the objects in R --How to import data into R --How to export data	
26 Sep 2019	**Lecture 4: Data Management-Part I** --Control Structure --Missing values --Dates --Useful functions --How to write our own functions	
3 Oct 2019	**Lecture 5: Data Management-Part II** --Subset data --Merge data --Reshape data --Assignment 1	
10 Oct 2019	**Lecture 6: Graphics with R** --Graphical functions and parameters --Multiple plots on one page --Save a plot	**Assignment 1 due**
17 Oct 2019	**Lecture 7: Descriptive statistics with R** --Quantitative variables	
24 Oct 2019	**Lecture 8: Descriptive statistics with R** --Categorical variables	

31 Oct 2019	**Lecture 9: Basic statistical tests with R** --Two sample tests --Analysis of variance --Correlation --Tabular data	
7 Nov 2019	**Lecture 10: Regression with R** --Simple linear regression --Multiple linear regression --Assignment 2	
14 Nov 2019	**Lecture 11: Regression with R** --Logistic regression --Poisson regression	**Assignment 2 Due**
21 Nov 2019	**Lecture 12: Regression with R** --Survival analysis --Assignment 3	
28 Nov 2019	**Lecture 13:** --Bootstrap --Analysis of clustered data --Non-linear effects	**Assignment 3 Due**
5 Dec 2019	**Wrap-up/spillover session**	

******NOTICE REGARDING ACADEMIC INTEGRITY AND PLAGIARISM******

The Department of Epidemiology and Biostatistics has asked instructors to remind students of McGill University of the following regulations regarding academic integrity and plagiarism: "McGill University values academic integrity. Therefore, all students must understand the meaning and consequences of cheating, plagiarism and other academic offences under the Code of Student Conduct and Disciplinary Procedures (see www.mcgill.ca/students/srr/honest/ for more information)."

Plagiarism

(a) No student shall, with intent to deceive, represent the work of another person as his or her own in any academic writing, essay, thesis, research report, project or assignment submitted in a course or program of study or represent as his or her own an entire essay or work of another, whether the material so represented constitutes a part or the entirety of the work submitted.

(b) Upon demonstration that the student has represented and submitted another person's work as his or her own, it shall be presumed that the student intended to deceive; the student shall bear the burden of rebutting this presumption by evidence satisfying the person or body hearing the case that no such intent existed, notwithstanding Article 22 of the Charter of Student Rights.

(c) No student shall contribute any work to another student with the knowledge that the latter may submit the work in part or whole as his or her own. Receipt of payment for work contributed shall be cause for presumption that the student had such knowledge; the student shall bear the burden of rebutting this presumption by evidence satisfying the person or body hearing the case that no such intent existed (notwithstanding Article 22 of the Charter of Students' Rights).

It is understood that assignments submitted by groups of students will include contributions of all group members; for such assignments, a single copy submitted with all group members' names will be sufficient. However, we expect that each group will submit its own assignment, written

separately from those of other groups. The same holds true for the protocol summaries. Where assignments cite others' research work, appropriate references must be provided. Direct quotes from other writers should be indicated by quotation marks.

Academic offences

The integrity of University academic life and of the degrees the University confers is dependent upon the honesty and soundness of the teacher- student learning relationship and, as well, that of the evaluation process. Conduct by any member of the University community that adversely affects this relationship or this process must, therefore, be considered a serious offence.
Downloaded and excerpted from A Handbook on Student Rights and Responsibilities, 2013, p. 4.
Available on-line at https://www.mcgill.ca/secretariat/files/secretariat/code_-student_-conduct-discipline-procedures_april_2013_final_revised_1.pdf
Additional information is available at www.mcgill.ca/integrity/

******NOTICE REGARDING THE SUBMISSION OF STUDENT ASSIGNMENTS******

"In accord with McGill University's Charter of Students' Rights, students in this course have the right to submit in English or in French any written work that is to be graded."

"Conformément à la Charte des droits de l'étudiant de l'Université McGill, chaque étudiant a le droit de soumettre en français ou en anglais tout travail écrit devant être noté (sauf dans le cas des cours dont l'un des objets est la maîtrise d'une langue)."