Psychology, Neuroscience, and Behaviour

COURSE OUTLINE

PNB 2XE3: Data and Descriptive Statistics

Winter 2020

Instructor: Dr. Nicholas Bock, Ph.D.
Department of Psychology, Neuroscience, and Behaviour/ Psychology Building 304
bockn@mcmaster.ca (please include “PNB 2XE3” in the subject of any email you send)

Lectures: Two one-hour lectures a week Mondays and Wednesdays 11:30AM - 12:20PM (PGCLL M16)

Tutorial/Laboratory: One two-hour combined tutorial/computer laboratory a week. Either:
Friday 12:30PM - 2:20PM (BSB 120)

or

Friday 12:30PM - 2:20PM (JHE 326H)

Please come to the section you are assigned to attend.

Teaching Assistants:
Arela Agako agakoa@mcmaster.ca
Kiersten Mangold mangoldk@mcmaster.ca
Lauren Smail smaillc@mcmaster.ca
Mario Simjanoski simjanom@mcmaster.ca
Parker Banks banksp@mcmaster.ca
Portia Kalun kalunp@mcmaster.ca

Office Hours: Thursdays 11:30-12:30 in the Psychology Building, Room 403 or by appointment

Course Website:
Information about the course, including lecture notes and handouts for the laboratories, will be available on McMaster’s Avenue to Learn system. The course will appear as PNB 2XE3: Data and Descriptive Statistics under the “My Courses” section.

Course Description:
Students will learn descriptive, graphical, and exploratory data analysis with an emphasis on how computers are used to collect, archive, and process data.

Intended Learning Outcomes:
By the end of this course, students should be able to:

1. Distinguish between a statistic of a sample and a parameter of a population.
2. Determine an appropriate measurement scale for given data.
3. Describe data distributions in terms of their shape and variability.
4. Interpret and create graphical displays of data, including boxplots, histograms, and scatterplots.
5. Compute the correlation coefficient ($r$) between two variables as well as fit the regression line that predicts one variable from another. Understand the principles of multiple regression.
6. Compute $z$-scores.
7. Learn about probability as it pertains to $p$-values and odds ratios.
8. Learn about sampling, the central limit theorem, and confidence intervals.
9. Learn about hypothesis testing using a one-sample $t$-test as an example.
10. Use computer programs including Excel and R to organize and visualize data, and perform statistical analyses.

**Text:**

There is no formal textbook for this course. The notes are intended to be comprehensive, but students are encouraged to turn to other sources on introductory statistics if they feel they need an expanded explanation of concepts.

Two suggested texts are:


*Note: this is currently the textbook for PNB 3XE3.

**Laptops and Software:**

Students will work on their own laptops in the weekly computer laboratories. We will be using Microsoft Excel and R, which can run on either Windows or Mac systems. Students who do not have Windows or Mac laptops should contact the instructor for accommodation.

We will use R version 3.6.2. This software is open-source and can be downloaded and installed from:

https://cloud.r-project.org/

We will also use Microsoft Excel. McMaster students can download this from:

https://www.mcmaster.ca/uts/licensing/msstudents.html

Please install the desktop version of Excel if you don’t already have it – the online Excel 365 is missing features we need for the labs.

**iClickers:**

Classroom response systems will be used in lectures. Students should purchase an iClicker at the Campus Bookstore (McMaster’s main bookstore). iClicker questions will serve as real-time feedback for students and the Instructor.

Throughout the course, we will use the iClicker system to generate data for use in computer labs. All such data will remain confidential and will be anonymized (i.e. not linked to your MacID). Data collected will solely be used for instructional purposes, and will not be distributed or reproduced. You are not required to answer any questions that make you feel uncomfortable.

**Evaluation:**

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<tr>
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<th>(% of final grade)</th>
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<tbody>
<tr>
<td>Homework Assignments</td>
<td>10</td>
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<tr>
<td>Lab Programming Tests</td>
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Midterm 30 Written during tutorial session
Final Exam 40

Homework Assignments:

Each week, the instructor will post onto Avenue a set of practice written questions. These will be collected at the beginning of a subsequent lecture and returned marked to students at their weekly tutorial. We will not accept late assignments handed in outside of the lecture.

Tutorials:

Students are required to attend their assigned weekly tutorials. The purpose of these are to (1) reinforce class content by reviewing the homework assignments and (2) introduce students to statistical software (Excel and R).

1. Tutorial portion
During the first portion of the tutorial, TAs will discuss the practice questions, and review important concepts from that week’s lectures. This is a great time to ask questions and get help!

2. Computer portion
The computer assignments are designed to introduce students to statistical software (Excel and R), and to teach data handling techniques that will be helpful in future courses/research. Your TAs will guide you through parts of the computer assignment; you are required to complete the rest of the lab on your own time, as practice, and in preparation for the lab programming tests. Please make sure you understand each lab before leaving the tutorial session.

Lab Programming Tests:

There will be two 2-hr lab programming tests held during tutorial sessions, during which students will complete a modified version of one of the computer assignments assigned throughout the term. The completed lab will be due at the end of the lab session and will be graded by the TAs.

Absences & Missed Work:

In the event of an absence for medical or other reasons, students should review and follow the Academic Regulation in the Undergraduate Calendar “Requests for Relief for Missed Academic Term Work”.

In the event a student submits an MSAF for a missing homework assignment, the final grade for the homework assignments will the be weighted average of the assignments that were not missed.

In the event a student submits an MSAF for an in-class test or a lab programming test, the student will need to contact the instructor to make alternate arrangements to write the missed test.

Academic Integrity:

You are expected to exhibit honesty and use ethical behaviour in all aspects of the learning process. Academic credentials you earn are rooted in principles of honesty and academic integrity. Academic dishonesty is to knowingly act or fail to act in a way that results or could result in unearned academic credit or advantage. This behaviour can result in serious consequences, e.g. the grade of zero on an assignment, loss of credit with a notation on the transcript (notation reads: “Grade of F assigned for academic dishonesty”), and/or suspension or expulsion from the university.

It is your responsibility to understand what constitutes academic dishonesty. For information on the various types of academic dishonesty please refer to the Academic Integrity Policy, located at www.mcmaster.ca/academicintegrity.
The following illustrates only three forms of academic dishonesty:

• Plagiarism, e.g. the submission of work that is not one’s own or for which other credit has been obtained.
• Improper collaboration in group work.
• Copying or using unauthorized aids in tests and examinations.

Academic Accommodation:

Students with disabilities who require academic accommodation must contact Student Accessibility Services (SAS) to make arrangements with a Program Coordinator. Student Accessibility Services can be contacted by phone 905-525-9140 ext. 28652 or e-mail sas@mcmaster.ca. For further information, consult McMaster University’s Academic Accommodation of Students with Disabilities policy.

Academic Accommodation For Religious, Indigenous Or Spiritual Observances (RISO):

Students requiring academic accommodation based on religious, indigenous or spiritual observances should follow the procedures set out in the RISO policy. Students requiring a RISO accommodation should submit their request to their Faculty Office normally within 10 working days of the beginning of term in which they anticipate a need for accommodation or to the Registrar's Office prior to their examinations. Students should also contact their instructors as soon as possible to make alternative arrangements for classes, assignments, and tests.

Copyright Policy:

In this course you will have access to material that is subject to copyright laws. This includes (but is not limited to) textbooks and all resources developed by the instructors such as lab manuals, demonstration videos, quizzes, assignments, tests, class notes and class slides. Under no circumstance are you allowed to share or redistribute this material in any printed or electronic form without the explicit written consent of the copyright holder. This includes posting any course material on Internet bulletin boards, course repositories, social networks, etc.

Extreme Circumstances:

The University reserves the right to change the dates and deadlines for any or all courses in extreme circumstances (e.g., severe weather, labour disruptions, etc.). Changes will be communicated through regular McMaster communication channels, such as McMaster Daily News, A2L and/or McMaster email.

The instructor retains the right to change any element of this course outline during the term in which it is taught.