Course Outline

Core Information:
Instructor: Joseph Beyene, PhD
Email: beyene@mcmaster.ca

Lectures: Tuesday – Wednesday – Friday @ 9:30am–10:20am in HSC 1A1
Office Hours: Friday’s, 11:00am, MDCL 3211

Teaching Assistants: Akram Alyass (alyassa@math.mcmaster.ca)
Tian Feng (tianf2@math.mcmaster.ca)
Regina Kampo (kampors@mcmaster.ca)
Kai Lui (liuk25@math.mcmaster.ca)
Zelalem Negeri (negerizf@mcmaster.ca)
Angela Wang (wanyq@mcmaster.ca)

Support Staff: Ashley Bonner (bonnea@mcmaster.ca)

Learning Objectives
The primary objective of this course is for students to develop quantitative communication skills beyond simple numeracy. All students will gain “statistical literacy” by the end of the term including abilities to:
• Summarize and describe data using appropriate numerical, tabular, and graphical methods;
• Understand data types and related theoretical distributions;
• Understand basic probability concepts;
• Apply appropriate statistical tests and estimation procedures based on an understanding of the study question, type of study design and type of data;
• Interpret the results of statistical analyses.

Marking Scheme
❖ 30 % Assignments, there will be 4 throughout the term, submitted online
❖ 30 % Midterm Exams, written
  o Midterm 1: Friday, Feb 9th during class time
  o Midterm 2: Friday, Mar 16th during class time
❖ 40 % Final Exam, written
  o Cumulative knowledge, but weighed more heavily towards later materials

Assignments
Assignments will be posted online through Avenue to Learn. Submission is accepted until the deadline, after which, unsubmitted assessments correspond to a mark of zero. All assignments must be submitted through Avenue to Learn; neither soft nor hard copies of assignments are accepted. Due to the large window for submission, though unlikely, encountering technical issues of any kind the evening of a deadline are not grounds for exemption. Late assignments are not accepted. If you anticipate an issue in
submitting an assignment on time, notify me as soon as possible; with appropriate notice I can try to make accommodations that avoid impacting your mark.

**Missed Assessment**
If you are unable to complete any assessment due to issues lasting up to three days, you must use the McMaster Student Absence Form and I must be notified as soon as possible. If you require more than one request or have an issue lasting more than three days, please contact the Faculty Office. See [https://www.mcmaster.ca/msaf/](https://www.mcmaster.ca/msaf/) for more information.

**Academic Misconduct**
The University takes academic misconduct seriously. Refer to the section of the University’s Office of Academic Integrity for further information. All student efforts evaluated in this course must be completed independently. I encourage students to work together but students must not copy each other’s work or share answers; this will be considered plagiarism.

**Computation**
You may only use McMaster’s official calculator during exams. I encourage you, and at times it may be necessary, to do assignments with R, a free programming language tailored for statistics. As appropriate, you should verify you can obtain the same answer with your calculator. Most of the work requiring R will be basic and easy to learn. I will provide several examples of code throughout the course.

**Lectures**
I will do my best to make slides available that contain some information so you have less to copy down. You will still be required to make your notes on other material presented in class, both displayed and spoken. You will be responsible for all of this material.

**Textbook**
Students can choose between Rosner 7th and 8th editions. Any differences between the two that are essential to the course will be provided online through Avenue to Learn.

**Other References**
I encourage you to have access to at least one other reliable source for conveying material besides my lectures and Rosner’s textbook. Almost any book introducing statistics (not just biostatistics) will do, but examples of books that focus on biostatistics are shown below:

- Principles of Biostatistics (Pagano and Gauvreau)
- Biostatistics: The Bare Essentials (Norman and Streiner)

Online resources may be less reliable, but often sufficient at a very superficial level.

**Online Discussions**
I’m happy answering questions but the volume slows me down considerably and the majority of questions that I receive are not unique. For this course, you will be required to make an effort posting your question before expecting an answer through email. I encourage you to use online discussions on Avenue to Learn for (and only for) course-related matters. Feel free to ask for clarity on concepts and
assignment questions. You are even more strongly encouraged to answer another student’s question when posted. Teaching assistants will closely monitor the discussion to confirm that a fellow student’s explanation is correct, or provide an official answer if one has not yet been provided in a timely manner. If your question has not be satisfactorily answered, please then send an email for further clarification.

Because teaching assistants have been designated to ensure that correct answers are available on Avenue to Learn, answers sought or found on other forums are not admissible in this course. Please manage your time wisely: we’ll do our best, but do not depend on a response from myself or a TA within 24 hours of an assessment’s deadline, or before a test/exam.

**Major Topics**

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<td>Overview</td>
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<td>- Sampling distribution</td>
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<td>- Central Limit Theorem</td>
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<td>- Confidence intervals</td>
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<td>Hypothesis Testing</td>
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<td>- z-tests, t-tests, 1-sample, 2-sample, paired, unpaired, continuous, categorical</td>
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<td>- non-parametric methods</td>
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<td>- 2x2 (nxm) tables and (\chi^2) tests, OR, RR, etc.</td>
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<td>- Correlation</td>
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