McMaster University | SCIENCE Department of Mathematics & Statistics

We recognize and acknowledge that McMaster University meets and learns on the traditional territories of the Mississauga and Haudenosaunee nations, and within the lands protected by the "Dish With One Spoon" wampum, an agreement amongst all allied Nations to peaceably share and care for the resources around the Great Lakes.

STATS 2B03 – Statistical Methods for Science

2023 Fall Term

Instructor: Aaron Childs | **E-mail:** childsa@mcmaster.ca | **Office:** HH-213

Office Hours: TBA

Class Time and Location:

- Check Mosaic for the latest information on class time.

Course Website

- Consult the course webpage on Childsmath for all announcements. Please check it regularly.

Course Description

Applied statistics, with emphasis on inferential methods relevant to the environmental and life sciences. Use of a computer statistics package.

Prerequisite(s): One of Grade 12 Data Management U, STATS 1A03, 1LL3 or registration in Level II or above of a program in the Faculty of Science

Not open to students with credit or registration in ARTSSCI 2R03, COMMERCE 2QA3, EARTH SC 2MB3, ECON 2B03, ENVIR SC 2MB3, GEOG 2MB3, HTH SCI 2A03, 2GG3, PNB 2XE3, STATS 2D03, 2MB3.

Course Format

- The course delivery will be in-person lectures. The in-person lectures will also be recorded.
- **Class Times** - Check Mosaic

Course and Learning Objectives

To obtain a good understanding of the basic fundamental ideas of statistics. To be able to carry out statistical calculations by hand. To be able to analyze large data sets using R. To be able to understand and interpret computer output, and their relation to hand calculations. To be able to determine which methods can be applied to a given data set. To understand and be able to check the assumptions behind each statistical procedure.

Materials & Fees

Textbook

- **Required:** Biostatistics for the Biological and Health Sciences, 3rd (or 2nd) Edition, by Triola, Triola, and Roy. Published by Pearson.
- **Optional:** Student Solutions Manual

Virtual Course Delivery

This course will run fully in-person in accordance with university directives and strict health and safety guidelines. It is the expectation that students be prepared to attend all lectures, labs/tutorials, tests, exams, and other evaluations in-person. However, students must be prepared to move to virtual learning should there be a change to health regulations and restrictions as issued by the Province or University.

To follow and participate in virtual classes it is expected that you have reliable access to the following:

- A computer that meets performance requirements found here.
- An internet connection that is fast enough to stream video.
- Computer accessories that enable class participation, such as a microphone, speakers and webcam when needed.

If you think that you will not be able to meet these requirements, please contact uts@mcmaster.ca as soon as you can. Please visit the Technology Resources for Students page for detailed requirements. If you use assistive technology or believe that our platforms might be a barrier to participating, please contact Student Accessibility Services, sas@mcmaster.ca, for support.

Course Overview and Assessment

Labs and TA's:

- Labs start on Monday September 11th.
- Attendance is optional. If you can do the Assignments on your own and do not need the help of a TA then you don't have to go to the scheduled lab times.
- Information about your TAs can be found on the TA Information Page

Software:

- R (pretty much any version). You can download it for free.

Material Covered:

- All sections covered in the suggested problems

- **Major Topics:** Describing data, graphical representations of data, probability, confidence intervals, hypothesis testing, one-way ANOVA, analysis of categorical data, regression and correlation
- **Approximate Schedule:** Types of Data and Descriptive Statistics (5 lectures), Probability (5 lectures), The Normal Distribution (3 lectures), Confidence Intervals and Hypothesis Testing (9 lectures), Analysis of Variance (3 lectures), Regression and Correlation (7 lectures), Categorical Data (3 lectures), Introduction to Nonparametric Statistics (1 lecture)

Assignments and Survey Information:

- You will be required to fill out (or at least read and acknowledge that you have read) this survey. The deadline for the completion of this survey is Friday September 8th at 11:59pm.
- There will be 6 online assignments. Part of these assignments will involve analyzing data from the survey.

Test Information:

- Some sample tests are under 'Content Groups' to the left.
- **Tentative Dates** (subject to change):

  Test #1: Evening of Tuesday October 17th

  Test #2: Evening of Thursday November 16th

  Check the Announcements for more information, and for instructions on what to do if you have a conflict with the test time.

Calculator and Formula Sheet:

- Only the McMaster Standard Calculator Casio fx-991 MS or MS Plus is allowed for tests and exam
- The formula sheets and tables on childsmath can be used with the tests and exam.

Course Evaluation:

Grade Component	Weight
1 Survey	1%
6 Assignments	15% (2.5% each)
2 Tests	40% (20% each)
Final Exam	44%

- At the end of the course the grades may be adjusted, but this can only increase your grade and will be done uniformly. We will use the grade equivalence chart published in the Undergraduate Calendar to convert between percentages and letter grades.
- The instructor and university reserve the right to modify elements of the course during the term. The university may change the dates and deadlines for any or all courses in extreme circumstances. If either type of modification becomes necessary, reasonable notice and communication with the students will be given with explanation and the opportunity to comment on changes. It is the responsibility of the student to check their McMaster email and course websites weekly during the term and to note any changes.

Requests for Relief for Missed Academic Term Work

McMaster Student Absence Form (MSAF): 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".

MSAF Course Specific Information

If you are absent from the university for a minor medical reason, lasting fewer than 3 days, you may report your absence, once per term, without documentation, using the McMaster Student Absence Form. Absences for a longer duration or for other reasons must be reported to your Faculty/Program office, with documentation, and relief from term work may not necessarily be granted. When using the MSAF, report your absence to childsa@mcmaster.ca . Please note that the MSAF may not be used for term work worth 25% or more, nor can it be used for the final examination.

If your MSAF form was received, then the word "note" will appear in place of your mark on the marks page. This will show up within one week after you filled out the MSAF form. If you don't see the word "note" in place of your mark for the missed work one week after filling out the MSAF form, then send an email to Dr. Childs. If you do see the word "note" in place of your mark, then no follow-up is required.

The percentage for a missed test will be added to your final exam.

The percentage for a missed assignment will be distributed among your remaining assignments.

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 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.

Academic Accommodation of Students with Disabilities

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

Courses with An On-Line Element

Some courses may use on-line elements (e.g. e-mail, Avenue to Learn (A2L), LearnLink, web pages, capa, Moodle, ThinkingCap, etc.). Students should be aware that, when they access the electronic components of a course using these elements, private information such as first and last names, user names for the McMaster e-mail accounts, and program affiliation may become apparent to all other students in the same course. The available information is dependent on the technology used. Continuation in a course that uses on-line elements will be deemed consent to this disclosure. If you have any questions or concerns about such disclosure, please discuss this with the course instructor.

Online Proctoring

Some courses may use online proctoring software for tests and exams. This software may require students to turn on their video camera, present identification, monitor and record their computer activities, and/or lock/restrict their browser or other applications/software during tests or exams. This software may be required to be installed before the test/exam begins.

Copyright and Recording

Students are advised that lectures, demonstrations, performances, and any other course material provided by an instructor include copyright protected works. The Copyright Act and copyright law protect every original literary, dramatic, musical and artistic work, **including lectures** by University instructors.

The recording of lectures, tutorials, or other methods of instruction may occur during a course. Recording may be done by either the instructor for the purpose of authorized distribution, or by a student for the purpose of personal study. Students should be aware that their voice and/or image may be recorded by others during the class. Please speak with the instructor if this is a concern for you.

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.

It is your responsibility to understand what constitutes academic dishonesty.

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. For information on the various types of academic dishonesty please refer to the *Academic Integrity Policy*, located at https://secretariat.mcmaster.ca/university-policies-procedures- guidelines/

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.

Authenticity / Plagiarism Detection

Some courses may use a web-based service (Turnitin.com) to reveal authenticity and ownership of student submitted work. For courses using such software, students will be expected to submit their work

electronically either directly to Turnitin.com or via an online learning platform (e.g. A2L, etc.) using plagiarism detection (a service supported by Turnitin.com) so it can be checked for academic dishonesty.

Students who do not wish their work to be submitted through the plagiarism detection software must inform the Instructor before the assignment is due. No penalty will be assigned to a student who does not submit work to the plagiarism detection software. **All submitted work is subject to normal verification that standards of academic integrity have been upheld** (e.g., on-line search, other software, etc.). For more details about McMaster's use of Turnitin.com please go to the McMaster Office of Academic Integrity's webpage.

Conduct Expectations

As a McMaster student, you have the right to experience, and the responsibility to demonstrate, respectful and dignified interactions within all our living, learning and working communities. These expectations are described in the *Code of Student Rights & Responsibilities* (the "Code"). All students share the responsibility of maintaining a positive environment for the academic and personal growth of all McMaster community members, **whether in person or online**.

It is essential that students be mindful of their interactions online, as the Code remains in effect in virtual learning environments. The Code applies to any interactions that adversely affect, disrupt, or interfere with reasonable participation in University activities. Student disruptions or behaviours that interfere with university functions on online platforms (e.g. use of Avenue 2 Learn, WebEx or Zoom for delivery), will be taken very seriously and will be investigated. Outcomes may include restriction or removal of the involved students' access to these platforms.

Additional information about the code and netiquette can found on the **Student Support and Case Management** website.

Equity and Inclusion

McMaster is committed to an inclusive and respectful community. These principles and expectations extend to online activities including electronic chat groups, video calls and other learning platforms. If you are concerned about your virtual classroom experiences, the Equity and Inclusion Office (EIO) is available

to advise and assist students who may be experiencing any equity, accessibility, inclusion, harassment, discrimination or sexual violence concerns. You can reach the EIO at equity@mcmaster.ca . Thank you for joining us in ensuring that our McMaster online communities are spaces where no one feels excluded and everyone is able to enjoy learning together.

Research Ethics - N/A

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.