

Department of Psychology and Neuroscience

PSYO 3511

Data Communication and Visualization in Psychology

Fall 2023

Dalhousie University is located in Mi'kma'ki, the ancestral and unceded territory of the Mi'kmaq. We are all Treaty people.

Instructor: John Christie john.christie@dal.ca room 2519, M 11:30-13:30
TA: Can Sozuer sozuer@dal.ca MS Teams T 10:00-12:00 and by appointment
Lectures: MW 13:35 - 14:25 P5208
Laboratories: T 13:05 - 14:25 P4208
Course delivery: In-person (*online and synchronous as necessary using MS Teams*)

Course Description

The history, psychology, and practical guidance in data visualization and reporting are covered. Open source statistics software will be used and so coding will be done. The format will be lecture and lab.

The mechanics of data visualization of data as well as understanding when and what kinds of visualizations to use for various situations are covered. Psychological research that underpins the reason for using various features of visualization is also covered as foundation. And the skills acquired are partially achieved through iterative design, a technique that also provides for generating best results. But visualization alone is not sufficient and therefore the verbal description of data and writing estimation based results sections is also covered.

Course Prerequisites

PSYO 2501, and PSYO/NESC 2000.

Course Exclusion

None

Learning Objectives

"The main goal [of this course] is self-actualization through the empowerment of claiming your education"—UCSC professor Marc Mangel's calculus syllabus

In the outcomes below note that they build on each other so that foundational outcomes become the actions that allow one to build another outcome.

- Implementing and understanding iterative design is a lynch pin for the course that will be fostered **through assignments and lab activities**. Most other learning objectives build from this.
- Time management is an additional crucial skill that be developed in this course because there are almost no hard deadlines for assignments.
- Coding skills will develop through the iterative design process and lab activities.

- Familiarity with the R statistical computing environment will arise from coding skill development in that language. Skill with statistics and visualization software is valuable in a variety of fields including journalism, business at all levels, and any scientific endeavour. In addition, questions of what to report and how to convey it through visualization and description will be studied.
- The iterating will also provide for a deep understanding of how data visualization and reporting is best explored.

Course Materials

- **RStudio** installed on a portable computer that you will bring to classes and labs. Once this is installed and working do not do any updates to the software over the course.
- **lab manual** provided by the course instructor
- Course **MS Teams** page where you will find information about additional readings and various other materials.
- A few **journal articles** will be required in the course but the bulk of your reading will likely be taken up with manuals and understanding the hows of making graphs.

Course Assessment

There are no **graded tests** of any kind. Assessment is done primarily through 7 assignments. Assignments 1-5 are worth one letter grade and assignments 6 and 7 are worth 2.

1. Visualization of provided data from simple studies with one response and one predictor.
2. Visualization of provided data from studies with more than one predictor.
3. Visualization of more complex designs
4. Visualization of provided data from simple studies with more than one measure / participant
5. Representing variability.
6. Full formatted results section (2)
7. Full results and participants section (2)

You can submit most assignments at any time before classes end (**Apr. 11**) but there is one exception to this. The first assignment must be submitted by **Jan. 25**. Note that **only one assignment may be in submission at a time**. Only after you have passed or withdrawn an assignment you may submit another. Fewer than 3 complete assignments will result in a grade of INC.

Brief description of grading: You start the course with no grade. And then you build on that grade. As you submit assignments you build your grade. Assuming you're going to complete 3 or more assignments total, suppose you pass assignment 1. You now have a D. And then, if you pass assignment 2 you have a C-, and so on. A fully passed 2 grade assignment would add 2 letter grades. For example, suppose you complete and fully pass assignment 6 and you were sitting at B-. Now you would have a B+. This system makes it very easy for you to see what you have and have not achieved. What follows are further details on how it works in practice. See Figure 1 below that shows a path of what happens to a submitted assignment.

Definition of a completed assignment: A submitted assignment is complete, even if not passed, if it contains all of the components requested in the assignment or answers all questions asked and any code runs without error. For example, the assignment may say you need to have a figure generated that has certain elements. If they are all there, then that is complete. If it is incomplete you'll receive a

notification within 24 hours with guidance on how to get the assignment complete and it will not be considered submitted until it is submitted complete. Once marked complete then it will then move on to being graded as pass or resubmit. If it is marked as a pass then you can submit your next assignment. If it is marked resubmit then you'll receive guidance on how to make it a pass. This feedback should not be expected in less than 48 hours from submission. Therefore, upon submission of an assignment a pass will typically take at least 3 days and may be over a week, considering resubmissions. If you wait until late in the term to submit assignments you won't get very many done.

Definition of a passed assignment: After being submitted, and accepted as complete, a passed assignment is one for which you have received notice of a pass from your instructor. The assignment will have addressed all of the required elements either correctly or nearly correctly and will demonstrate an understanding of all of those elements. Because part of what you're doing in this course is building a skill, it's important that at each level you gain a degree of expertise rather than just get, for example, 70% of the material. This is similar to how in math you need to know the whole times table in order to move on to division, not 70% of the table. Therefore, any one assignment needs to be done minimally to an A or A+ level in order to be passed. Further, that way it makes sense that passing all of the assignments is an A+ grade.

A proposed schedule: There are 12 weeks in the course over a 13 week period. With 7 assignments, a good schedule is to wait a week or two at most to get some grounding and then start with assignment 1 and **attempt to maintain an approximately one assignment every week pace**. This leaves plenty of room for life to intervene and still get all of the assignments done. Look at your other courses and their schedules and work out in advance what will work best for you. **That is your first homework assignment and is due by the end of the 7th day after classes start**. Submit a schedule of when you'll start working on each assignment and what your personal due date is. Just put it in the body of an email with the subject line [P3511] proposed schedule.

Other than for assignment one, the only deadline is that the **final date to submit an assignment** is the last day of classes (**Apr. 11**) and you can only submit one that day. If it is not a pass on submission then there are only 2 resubmission opportunities given and they must be passed within 6 days after the end of classes (**April 17**). Further, any assignments already in submission by the last day only have 2 additional resubmissions allowed.

What if I'm stuck? We don't wish to let anyone linger on issues they're just not understanding or problems with email communication. Therefore, **if you take 3 attempts at an assignment and it is still not a pass you will be contacted for a meeting**. This will be a discussion to help you and understand the issues preventing you from moving forward. These are often very productive meetings and many times students who attend these meetings end up coming to office hours more frequently. Most of the time the meeting also results in a quick completion of the assignment.

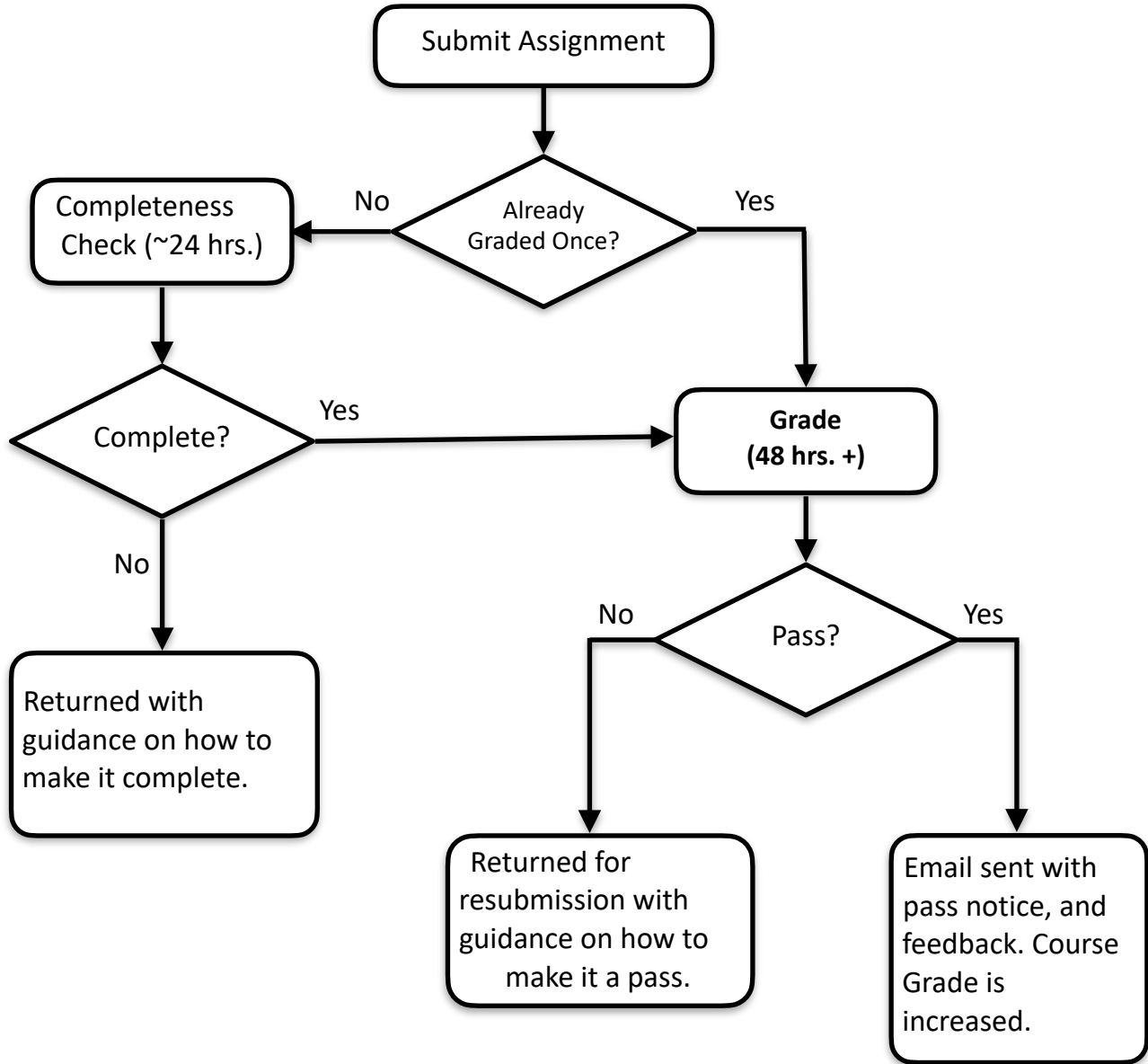
Nevertheless, rarely someone can get stuck on a concept and they just can't turn an assignment into a pass. There's no reason they finish there. So an assignment can be withdrawn in order to submit another. Once withdrawn, it cannot be submitted again. Further guidance on what would have been learned and a walk through of a passed assignment will also occur upon withdrawal.

Other course requirements

You may have noted that, with 7 assignments, 2 of which are worth 2 letter grades, that's only a total of 9 grades and can only get you to an A. The extra letter grade is in attendance and participation. You are allowed to miss, or fail to participate in, up to 2 sessions, one of which may be a lab, without excuse. Note that participation will be assessed as to whether you are contributing and participating in class discussion, exercises, or submitting homework assignments. If you are marked as not participating you will be notified soon after that occurs.

Excused classes or labs will not count against this grade. Excused classes will be granted upon reasonable discussion with the instructor which usually just requires a polite email requesting an exemption. We will not be using SDAs.

Figure 1. What happens with a submitted assignment.



In order to facilitate understanding of the assessment system a couple of examples of a student's progress in the course and their status is given. They represent extremes in how one could progress and receive a grade. Example one is someone with ideal progression where they subsequently pass every completed assignment. The second is someone who ends up with a D grade granted using an unusual path. Note in the second example, assignment completion is not necessarily tied to assignment passing. Also, assignments can be done out of order but it is not advised.

Example 1.

Letter grade	Incomplete?	Complete Assignments	Passed Assignments	Criteria
F	INC	0	0	The INC is based on Insufficient evidence of understanding of the subject matter at this point. Another submission is needed to see if the grade, that reflects weakness in critical and analytical skills, is warranted.
D	INC	1	1	
C-	INC	2	2	
C	Grade granted	3	3	Evidence of very good understanding of a small subset of the subject matter; ability to develop solutions to simple problems; benefitting from their university experience.
C+	Grade granted	4	4	Evidence of excellent grasp of a subset of the subject matter, some evidence of critical capacity and analytical ability; reasonable understanding of relevant issues.
B-	Grade granted	5	5	
B+	Grade granted	Assignment 6 with 2 grades.	6	Considerable evidence of original thinking; demonstrated outstanding capacity to analyze and synthesize; outstanding grasp of subject matter; evidence of extensive knowledge base.
A+	Grade granted	Assignment 7 + participation	Assignment 1 completed	

Example 2.

Letter grade	Incomplete?	Complete Assignments	Passed Assignments	Criteria
F	INC	0	0	The INC is based on Insufficient evidence of understanding of the subject matter at this point. Another submission is needed to see if the grade, that reflect weakness in critical and analytical skills is warranted.
D	INC	1	1	
D	INC	2	1	
D	Grade granted	3	1	Grade reflects weakness in critical course skills. (see objectives)

Course Policies on Missed or Late Academic Requirements

Any Assignment 1's not submitted by 11:59pm on Jan. 25th will not be graded and will be considered "missed" with no opportunity to make-up. The submission must appear to be a serious attempt whether complete at that point or not. Students who do not submit Assignment 1 will not receive a grade for that assignment, but **can** continue to participate and complete Assignments 2-7. Those who miss assignment 1 are strongly advised to meet with Dr. Christie to discuss their course progress and plan.

Course Policies related to Academic Integrity

Make sure that you do not work together on graded assignments, they all need to be done individually. Your assignment must be your own. Should you hire a tutor or acquire other outside help you must contact your instructor to have the tutor approved; or ask the instructor for the contact of an approved tutor. See the assignment submission guidelines you get in email for more details here. It is important to note that there are many ways to accomplish the assignments and a tutor unfamiliar with what you have been taught won't be able to integrate their assistance with the course. In that case they may end up increasing your workload. So have any prospective tutors contact your instructor to check qualifications and advise them on how best to assist you.

Collaboration on homework assignments that are part of course participation grade is permitted, and encouraged.

See the Dalhousie Academic Calendar on University regulations regarding cheating and plagiarism. Any instances of academic integrity violations will be brought to enforcement without discussing them with the students involved. This is in accordance with academic integrity guidelines.

Course Content

What follows is a brief outline of the actual content. In general, classes and labs will be interactive with the distinction that classes will be a little more heavy on lecture whereas labs will be about finding your own way in group or individual work. Not all labs will take the entire lab time. When a short lab occurs the extra time will be dedicated to assisting with assignments. Note that in parentheses after certain weeks an assignment number is mentioned. This means the material being covered that week or close to that time is especially pertinent to the assignment and it's a good idea to start the assignment then.

week 1 - What makes a good graph? This question will be explored throughout the term. - lab, make first simple figures and R familiarization. It is expected that you have studied the lab manual.

week 2 - Psychology of graph marks. -lab, expanding what we've done so far with more kinds of predictors. (assignment 1)

week 3 - Repeated measures or within subjects designs both class and lab (assignment 2)

week 4 - Expanding repeated measures through various data types both class and lab (assignment 3)

week 5 - Embracing variability, both class and lab. (assignment 4)

week 6 - How to describe data and figures. - lab, exercises in same.

week 7 - Reporting results through parameter estimation. - lab, effect sizes (assignment 5)

week 8 - How to discuss your participants, and why. - lab, the logic of tests

week 9 - results sections in papers, both class and lab ((assignment 6)

week 10 - Archival data reporting. -lab, table design

week 11 - Embracing variability. (assignment 7)

week 12 - Future directions, no formal lab but the time will be reserved for help in assignments

University Policies and Statements

Recognition of Mi'kmaq Territory

Dalhousie University would like to acknowledge that the University is on Traditional Mi'kmaq Territory. The Elders in Residence program provides students with access to First Nations elders for guidance, counsel, and support. Visit or e-mail the Indigenous Student Centre at 1321 Edward St or elders@dal.ca. Additional information regarding the Indigenous Student Centre can be found at: https://www.dal.ca/campus_life/communities/indigenous.html

Internationalization

At Dalhousie, 'thinking and acting globally' enhances the quality and impact of education, supporting learning that is "interdisciplinary, cross-cultural, global in reach, and orientated toward solving problems that extend across national borders." Additional internationalization information can be found at: <https://www.dal.ca/about-dal/internationalization.html>

Academic Integrity

At Dalhousie University, we are guided in all our work by the values of academic integrity: honesty, trust, fairness, responsibility, and respect. As a student, you are required to demonstrate these values in all the work you do. The University provides policies and procedures that every member of the university community is required to follow to ensure academic integrity. Additional academic integrity information can be found at: https://www.dal.ca/dept/university_secretariat/academic-integrity.html

Accessibility

The Student Accessibility Centre is Dalhousie's centre of expertise for matters related to student accessibility and accommodation. If there are aspects of the design, instruction, and/or experiences within this course (online or in-person) that result in barriers to your inclusion, please contact the Student Accessibility Centre (https://www.dal.ca/campus_life/academic-support/accessibility.html) for all courses offered by Dalhousie with the exception of Truro. For courses offered by the Faculty of Agriculture, please contact the Student Success Centre in Truro (<https://www.dal.ca/about-dal/agricultural-campus/student-success-centre.html>)

Conduct in the Classroom – Culture of Respect

Substantial and constructive dialogue on challenging issues is an important part of academic inquiry and exchange. It requires willingness to listen and tolerance of opposing points of view. Consideration of individual differences and alternative viewpoints is required of all class members, towards each other, towards instructors, and towards guest speakers. While expressions of differing perspectives are welcome and encouraged, the words and language used should remain within acceptable bounds of civility and respect.

Diversity and Inclusion – Culture of Respect

Every person at Dalhousie has a right to be respected and safe. We believe inclusiveness is fundamental to education. We stand for equality. Dalhousie is strengthened in our diversity. We are a respectful and inclusive community. We are committed to being a place where everyone feels welcome and supported, which is why our Strategic Direction prioritizes fostering a culture of diversity and inclusiveness (Strategic Priority 5.2). Additional diversity and inclusion information can be found at: <http://www.dal.ca/cultureofrespect.html>

Student Code of Conduct

Everyone at Dalhousie is expected to treat others with dignity and respect. The Code of Student Conduct allows Dalhousie to take disciplinary action if students don't follow this community expectation. When appropriate, violations of the code can be resolved in a reasonable and informal manner - perhaps through a restorative justice process. If an informal resolution can't be reached, or would be inappropriate, procedures exist for formal dispute resolution. The full Code of Student Conduct can be found at: https://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

Fair Dealing Policy

The Dalhousie University Fair Dealing Policy provides guidance for the limited use of copyright protected material without the risk of infringement and without having to seek the permission of copyright owners. It is intended to provide a balance between the rights of creators and the rights of users at Dalhousie. Additional information regarding the Fair Dealing Policy can be found at: https://www.dal.ca/dept/university_secretariat/policies/academic/fair-dealing-policy-.html

Originality Checking Software

The course instructor may use Dalhousie's approved originality checking software and Google to check the originality of any work submitted for credit, in accordance with the Student Submission of Assignments and Use of Originality pChecking Software Policy. Students are free, without penalty of grade, to choose an alternative method of attesting to the authenticity of their work and must inform the instructor no later than the last day to add/drop classes of their intent to choose an alternate method. Additional information regarding Originality Checking Software can be found at: https://www.dal.ca/dept/university_secretariat/policies/academic/student-submission-of-assignments-and-use-of-originality-checking-software-policy-.html

Student Use of Course Materials

Course materials are designed for use as part of this course at Dalhousie University and are the property of the instructor unless otherwise stated. Third party copyrighted materials (such as books, journal articles, music, videos, etc.) have either been licensed for use in this course or fall under an exception or limitation in Canadian Copyright law. Copying this course material for distribution (e.g. uploading to a commercial third-party website) may lead to a violation of Copyright law.