1.0 CALENDAR DESCRIPTION
An introduction to measurement and analysis in health sciences research, covering topics such as validity, reliability, standard errors, confidence intervals, tests of means, correlation, and linear regression.

Prerequisites: Health Sciences 2801a/b or equivalent
Antirequisites: All other University-level statistics courses at the 2000-level or above

Note regarding prerequisite checking
Unless you have either the requisites for this course or written special permission from your Dean to enroll in it, you may be removed from this course and it will be deleted from your record. This decision may not be appealed. You will receive no adjustment to your fees in the event that you are dropped from a course for failing to have the necessary prerequisites.

2.0 COURSE INFORMATION
Instructor: Dr. Andrew Johnson
Arthur and Sonia Labatt Health Sciences Building, Room 330
ajohnson@uwo.ca

Office Hours: By appointment (see OWL signup for details) in HSB 330

Course Website: https://owl.uwo.ca

Times and Location of Tutorials: 8:30am to 9:30am NS 145

Times and Location of Lectures: 9:30am to 11:30am Fridays NS 145

3.1 TEXTBOOKS
There are no required textbooks for this course. If you wish to have a textbook for the course, I recommend the OpenStax text by Illowsky et al., and wherever possible, I’ve provided you with appropriate page ranges for our topics. The PDF of this text is available for free through OpenStax.org, or you may purchase a professionally bound copy for approximately $40 through Amazon.com. More information can be found here:

https://openstax.org/details/introductory-statistics

3.2 CALCULATOR
You will need a calculator with a “stats mode” for this course. You should choose a calculator that is easy to use, rather than one that has a lot of functions not needed for this course. A calculator sufficient for this course should cost approximately $15 to $35. If you currently have a calculator, and are unsure if it is adequate, you may show it to me after a lecture, or during office hours. Bring your calculator to all lectures, labs, and tests. Some calculators are quite complex – it is a good idea to hang onto the instruction manual until you are sure that you know how to use it.

4.0 COURSE OBJECTIVES
In this course, you will be introduced to statistical analyses in the health sciences, with an emphasis on learning how the analyses are conducted by hand. By the end of the course, you will be comfortable with the theory and mechanics of calculating measures of central tendency and dispersion, standard scores, t-tests (both independent and dependent), bivariate correlation and regression, simple chi-square calculations for frequency distributions, and simple ANOVAs (both independent and dependent).
5.1 EVALUATION

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Date</th>
<th>Weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm</td>
<td>2019.02.15</td>
<td>35%</td>
</tr>
<tr>
<td>Online Quizzes</td>
<td>throughout the course</td>
<td>15%</td>
</tr>
<tr>
<td>Final Exam</td>
<td>TBA (during final exam period)</td>
<td>50%</td>
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Midterm: The midterm for this course will cover course material presented (either in class, or through OWL) between 2019.01.11 and 2019.02.01 (inclusive). The test will consist solely of multiple-choice questions, and will be closed-book (although you will be provided with a formula sheet during the exam). You will need a calculator for the exam. This exam will be held during lecture on February 15, 2019. You will be notified via OWL as to where you will be writing the exam.

Online Quizzes: I have created eight online quizzes that are available to help you review exam material. These online quizzes may involve multiple-choice or fill-in-the-blank questions, and are (obviously) open-book examinations. You should plan to use a calculator, and any formulae that we have covered in class. My expectation is that you will do these quizzes individually, and not with your classmates. You will have 20 minutes to complete each quiz, and quizzes are due at 11:55pm on the dates noted within the course schedule. Each quiz will be equally weighted in the calculation of your final quiz grade, and may be submitted only once. Late quizzes will not be accepted, as question-level feedback will be released the day after each quiz is due. Students receiving academic accommodation will have the value of the accommodated quiz(izes) distributed amongst the remaining quizzes.

Final Exam: The final exam for this course will cover all material presented throughout the term (including material presented in class, and through OWL). The test will consist solely of multiple-choice questions, and will be closed-book (although you will be provided with a formula sheet during the exam). You will need a calculator for the exam. This exam will be held during the final exam period, and you will be notified via OWL as to where you will be writing the exam.

NOTE: Computer-marked multiple-choice tests and/or exams may be subject to submission for similarity review by software that will check for unusual coincidences in answer patterns that may indicate cheating.

5.2 EXAM DATES / LOCATIONS

<table>
<thead>
<tr>
<th>Evaluation</th>
<th>Location</th>
<th>Date</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>Midterm</td>
<td>NS 145</td>
<td>2019.02.15</td>
<td>9:30am to 11:15am</td>
</tr>
<tr>
<td>Final Exam</td>
<td>TBA (scheduled by Registrar, and held during final exam period)</td>
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5.3 MAKEUP EXAM DATES / LOCATIONS

You must have a valid medical or compassionate reason for missing a scheduled evaluation, and documentation for your absence must be filed with the main office of the School of Health Studies. See section 7.2 of this outline for information concerning acceptable documentation of illness. Retroactive exam accommodation (i.e., for exams that have been written) will not generally be granted. Makeup examinations will consist of some combination of multiple choice questions, essay questions, and computational questions. Makeup examinations are scheduled by the School of Health Studies. You will be given information as to the date, time, and location of the makeup examination after you have been granted permission to write the examination. NOTE: There is no second makeup examination for the midterm in this course. Students that are unable to write the makeup examination as scheduled by the School (for any reason) will have the value of that exam shifted to the final examination (i.e., the final examination will account for 85% of your grade in the course).
### LECTURE / LAB SCHEDULE

<table>
<thead>
<tr>
<th>Date</th>
<th>Lecture Topics</th>
<th>OPTIONAL Text Reference</th>
<th>Online Quiz(zes) Due</th>
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</thead>
<tbody>
<tr>
<td>2019.01.11</td>
<td>Describing Data</td>
<td>Sections 1.1, 2.1-2.8, 6.1-6.4</td>
<td>2019.01.18</td>
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<tr>
<td>2019.01.18</td>
<td>Introduction to Hypothesis Testing</td>
<td>Sections 7.1-7.5, 8.1-8.6</td>
<td>2019.01.25</td>
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<tr>
<td>2019.01.25</td>
<td>Single Sample Inference</td>
<td>Sections 9.1-9.6</td>
<td>2019.02.01</td>
</tr>
<tr>
<td>2019.02.01</td>
<td>Correlation &amp; Regression</td>
<td>Sections 12.1-12.9</td>
<td>2019.02.08</td>
</tr>
<tr>
<td>2019.02.08</td>
<td>Count Data</td>
<td>Sections 11.1-11.2, 11.3, 11.5, 11.7, 11.8</td>
<td>2019.03.01</td>
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<tr>
<td>2019.02.15</td>
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<tr>
<td>2019.02.22</td>
<td>Midterm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2019.03.01</td>
<td>Independent Groups t-test</td>
<td>Section 10.1</td>
<td>2019.03.08</td>
</tr>
<tr>
<td>2019.03.08</td>
<td>Dependent Groups t-test</td>
<td>Section 10.4</td>
<td>2019.03.15</td>
</tr>
<tr>
<td>2019.03.15</td>
<td>ANOVA, Independent Groups</td>
<td>Sections 13.1-13.5</td>
<td></td>
</tr>
<tr>
<td>2019.03.22</td>
<td>ANOVA, Dependent Groups</td>
<td>No Text Reference</td>
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</tr>
<tr>
<td>2019.03.29</td>
<td>Pairwise Comparisons</td>
<td>No Text Reference</td>
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<tr>
<td>2019.04.05</td>
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**Note:** lecture / lab schedule subject to change

### GENERAL COURSE NOTES

#### Student Code of Conduct
You are expected to comply with the Code of Student Conduct at all times within the classroom, and when dealing with members of the instructional team. The purpose of this Code is to define the general standard of conduct expected of students registered at The University of Western Ontario, provide examples of behaviour that constitutes a breach of this standard of conduct, provide examples of sanctions that may be imposed, and set out the disciplinary procedures that the University will follow. For more information, visit [http://www.uwo.ca/univsec/pdf/board/code.pdf](http://www.uwo.ca/univsec/pdf/board/code.pdf).

#### Course Website
This course is a totally “paperless” course, and as such the course website will be your sole source for lecture overheads, readings, and course information (including this course outline). Due to privacy regulations, grades will only be provided to you through OWL – I will not, under any circumstance, convey grades via email, or over the phone.

#### Online Discussion Forum
An online discussion forum has been set-up on OWL, and you are encouraged to use this resource to locate and set-up study groups, and to ask questions regarding course content and procedures.

#### Email
I am happy to answer your questions via email. You must, however, use your UWO email address for all correspondence regarding this course. Because the University ‘anti-spam’ programs often reject email from Gmail, iCloud, Hotmail, Yahoo, and other public email addresses, there is no guarantee that I will receive your emails if you send them from a public email program – or from any off-campus server, when sending email using any method other than the university’s webmail system. That said, I will do my best to answer your emails promptly. Please try to limit your questions to administrative matters only – detailed questions on course content are best: (a) raised during (or immediately after) lectures, (b) asked during office hours, or (c) posted to the online discussion forum.

#### Lecture Attendance
You are expected to attend every class, as some material that is covered during lecture will not be in the course notes.
**Eating and Drinking in Class**
Out of consideration for your fellow students, please refrain from eating during class (lidded beverages are acceptable).

**Grade Adjustments**
Final grades in this course will be taken to the closest integer (i.e., I will “round off” decimals). Exam grades will be calculated out of 100% to one decimal place. I will not, under any circumstances, “bump up” your grade (i.e., to facilitate professional school applications etc.). This includes grades that end in a “9”. Along similar lines, I will not reweight examinations for reasons other than those outlined in section 5.3. In other words – I will not alter exam weights for evaluations that you have already written.

**Policy on Electronic Devices**

*During Exams:*
Unless you have medical accommodations that require you to do so, or explicit permission from the instructor of the course, you may not use any of the following electronic devices during ANY of the tests, quizzes, midterms, examinations, or other in-class evaluations: cellphones, smart phones, smart watches, smart glasses, audio players or recorders of any sort, video cameras, video games, DVD players, televisions, laptop/notebook/netbook computers, flashlights or laser pointers.

*During Lectures and Tutorials:*
Although you are welcome to use a computer during lecture and tutorial periods, you are expected to use the computer for scholastic purposes only, and refrain from engaging in any activities that may distract other students from learning. From time to time, your professor may ask the class to turn off all computers, to facilitate learning or discussion of the material presented in a particular class. Unless explicitly noted otherwise, you may not make audio or video recordings of lectures – nor may you edit, re-use, distribute, or re-broadcast any of the material posted to the course website.

**Example Questions**
Some of the examples used within this course were drawn from the sample problem set used by psychology statistics instructors, at The University of Western Ontario. They are used with permission.

7.2 **POLICY REGARDING ILLNESS**

[https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf](https://www.uwo.ca/univsec/pdf/academic_policies/appeals/accommodation_illness.pdf)

The University recognizes that a student’s ability to meet his/her academic responsibilities may, on occasion, be impaired by medical illness. Illness may be acute (short term), or it may be chronic (long term), or chronic with acute episodes. The University further recognizes that medical situations are deeply personal and respects the need for privacy and confidentiality in these matters. However, in order to ensure fairness and consistency for all students, academic accommodation for work representing 10% or more of the student’s overall grade in the course shall be granted only in those cases where there is documentation indicating that the student was seriously affected by illness and could not reasonably be expected to meet his/her academic responsibilities.

A UWO Student Medical Certificate (SMC) is required where a student is seeking academic accommodation. This documentation should be obtained at the time of the initial consultation with the physician or walk-in clinic. An SMC can be downloaded under the Medical Documentation heading of the following website:


Documentation is required for non-medical absences where the course work missed is more than 10% of the overall grade. Students may contact their Faculty Academic Counselling Office for what documentation is needed.

Whenever possible, students who require academic accommodation should provide notification and documentation in advance of due dates, examinations, etc. Students must follow up with their professors and their Academic Counselling office in a timely manner. Documentation for any request for accommodation shall be submitted, as soon as possible, to the appropriate Academic Counselling Office of the student’s Faculty of registration. For BHSc students, you may go to the School of Health Studies Office in HSB room 222.
7.3 POLICY ON CHEATING & ACADEMIC MISCONDUCT

Scholastic offences are taken seriously and you are directed to read the appropriate policy, specifically, the definition of what constitutes a Scholastic Offence, at the following Web site:
http://www.uwo.ca/univsec/pdf/academic_policies/appeals/scholastic_discipline_undergrad.pdf

7.4 HEALTH AND WELLNESS

As part of a successful undergraduate experience at Western, we encourage you to make your health and wellness a priority. Western provides several on-campus health-related services to help you achieve optimum health and engage in healthy living while pursuing your degree. For example, to support physical activity, all students receive membership in Western’s Campus Recreation Centre as part of their registration fees. Numerous cultural events are offered throughout the year. Please check out the Faculty of Music web page (http://www.music.uwo.ca/), or the McIntosh Gallery (http://www.mcintoshgallery.ca/). Further information regarding health and wellness-related services available to students may be found at http://www.health.uwo.ca/.

If you are in emotional or mental distress should refer to Mental Health@Western (http://www.uwo.ca/uwocom/mentalhealth/) for a complete list of options about how to obtain help. To help you learn more about mental health, Western has developed an interactive mental health learning module, found here: https://uwo.ca/health/mental_wellbeing/education/module.html.

7.5 SUPPORT SERVICES

There are various support services around campus, and these include (but are not limited to):

- Student Development Centre -- http://www.sdc.uwo.ca/ssd/
- Student Health -- http://www.shs.uwo.ca/student/studenthealthservices.html
- Registrar’s Office -- http://www.registrar.uwo.ca/
- Ombuds Office -- http://www.uwo.ca/ombuds/

8.0 PROCEDURES FOR APPEALING ACADEMIC EVALUATIONS

In the first instance, all appeals of a grade must be made to the course instructor (informal consultation). If you are not satisfied with the decision of the course instructor, a written appeal must be sent to the Director of the School of Health Studies. If you consider this response to be unsatisfactory, you may then appeal to the Dean of the Faculty of Health Sciences. If this response is unsatisfactory, you may appeal to the Senate Review Board Academic. A Guide to Appeals is available from the Ombudsperson's Office.

The university-wide descriptor of the meaning of letter grades, as approved by Senate:

- A+ 90-100 One could scarcely expect better from a student at this level
- A  80-89 Superior work that is clearly above average
- B  70-79 Good work, meeting all requirements and eminently satisfactory
- C  60-69 Competent work, meeting requirements
- D  50-59 Fair work, minimally acceptable.
- F  below 50 Fail

It is expected that the grades for this course will fall between 72 and 76. In the event that the course average falls outside this range, a constant may be added to (or subtracted from) each student’s grade, by the instructor, to bring the class average in line with school policy.