Carleton University
School of Mathematics and Statistics
STAT 2507 and BIT 2000:
Introduction to Statistical Modeling I
Fall 2019, Section C

Instructor: Alia Alkhathami      Office hours: Tuesday 12:00-1:00 p.m.
Email: aliaalkhathami@cmail.carleton.ca   Thursday 12:00-1:00 p.m.
Office Room: 4260 Herzberg Laboratories Or by appointment
Lecture (Location): Tory Building, Room 360.
Lecture (Date & Time): Tue/Thu, 10:05 a.m-11:25 a.m.

Course Description: Basic descriptive statistics, introduction to probability theory, random variables, discrete and continuous distributions, contingency tables, sampling distributions, distribution of sample mean, Central Limit Theorem, interval estimation and hypothesis testing. A statistical software package will be used.

Prerequisites: An Ontario Grade 12 university-preparation Mathematics or equivalent, or permission of the School of Mathematics and Statistics.


Calculators: Only non-programmable, non-graphing calculators are allowed on the Midterm and final exam.

Marking Scheme: Your final grade will be calculated as:

| Attendance | 3% |
| Assignments | 22% |
| Midterm Exam | 25% |
| Final Exam | 50% |

Computer labs: First lab is anticipated to start on September 11, 2019. Exact date will be announced in class and on CuLearn. You will have one-hour computer lab per week in 4385 HP. You are not allowed to switch labs. The statistical software Minitab will be used. Labs are scheduled as following:

<table>
<thead>
<tr>
<th>Section</th>
<th>TA’s Name</th>
<th>TA’s email</th>
<th>Time</th>
</tr>
</thead>
<tbody>
<tr>
<td>C1</td>
<td>Melissa Van Bussel</td>
<td><a href="mailto:melissavanbussel@cmail.carleton.ca">melissavanbussel@cmail.carleton.ca</a></td>
<td>Tue: 14:35-15:25</td>
</tr>
<tr>
<td>C2</td>
<td>Montader Ali</td>
<td><a href="mailto:montaderali@cmail.carleton.ca">montaderali@cmail.carleton.ca</a></td>
<td>Tue: 08:35-09:25</td>
</tr>
<tr>
<td>C3</td>
<td>Peter L’Oiseau</td>
<td><a href="mailto:peterloiseau@cmail.carleton.ca">peterloiseau@cmail.carleton.ca</a></td>
<td>Tue: 13:35-14:25</td>
</tr>
<tr>
<td>C4</td>
<td>Montader Ali</td>
<td><a href="mailto:montaderali@cmail.carleton.ca">montaderali@cmail.carleton.ca</a></td>
<td>Mon: 12:35-13:25</td>
</tr>
<tr>
<td>C5</td>
<td>Peter L’Oiseau</td>
<td><a href="mailto:peterloiseau@cmail.carleton.ca">peterloiseau@cmail.carleton.ca</a></td>
<td>Thu: 13:35-14:25</td>
</tr>
<tr>
<td>C6</td>
<td>Adam Shen</td>
<td><a href="mailto:adamshen@cmail.carleton.ca">adamshen@cmail.carleton.ca</a></td>
<td>Mon: 16:35-17:25</td>
</tr>
<tr>
<td>C7</td>
<td>Adam Shen</td>
<td><a href="mailto:adamshen@cmail.carleton.ca">adamshen@cmail.carleton.ca</a></td>
<td>Wed: 11:35-12:25</td>
</tr>
<tr>
<td>C8</td>
<td>Le Tang</td>
<td><a href="mailto:letang@cmail.carleton.ca">letang@cmail.carleton.ca</a></td>
<td>Wed: 13:35-14:25</td>
</tr>
</tbody>
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Assignments: There will be four assignments given during the term with specific due dates that will be announced in class and posted on CuLearn. Each assignment equally counts toward the term mark. The assignments must be handed In Class.
**Attendance:** Attendance is mandatory. In order to get the 3% allotted to attendance, you will need to attend at least 90% of classes.

**Homework:** Selected exercises, mainly from the text, will be posted on CuLearn. These exercises are not to be handed in and will not be graded. However, I recommend you to do them on a regular basis in order to success in the course and come to see me if you are having difficulties with them.

**Midterm Exam:** There will be Two-hours closed-book exam, which is scheduled for Saturday, November 2, 2019 from 1pm to 3pm. The location of the midterm room will be posted on cuLearn at least one week before the test.

**Final Exam:** There will be a 3-hour closed-book final exam scheduled by University during exam period December 9-21. It is the responsibility of each student to be available during exam period, so make sure no travel plans are made during this time period. The exam will cover all materials during the term where the format includes both multiple-choice and full solution questions.

**Important Course policy:**

* All assignments, solutions, some practice problems, and announcements will be posted on the CuLearn on a regular basis. It is your responsibility to keep up with information announced in class and on CuLearn.

* No Late assignment is accepted. You will be given enough time to finish them on due date.

* Grading concerns about assignment or midterm exam must be brought to our attention within two business days of these items being available for review.

* Students who will miss the final exam for a legitimate and documented reason is eligible to write a deferred exam approximately one week after the original exam. Application for a deferral exam must be made, with appropriate documentation, to the Registrars Office.

* Students who will miss the midterm will receive a zero unless you provide your instructor with original hardcopy of supportive document within one-week. In this case, the weight of the midterm will be transferred to the final.

* Students must collect their midterm exams prior the end of semester. Otherwise, those papers will be disposal.

* Students wish to review their final exam, must email me for an appointment within a three week period from submitting the grades at CuLearn. This appointment is not to change their grades but it will be only for education purpose.

**Academic Accommodation:** You may need special arrangements to meet your academic obligations during the term. For an accommodation request the processes are as follows:

* Pregnancy obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website [http://www2.carleton.ca/equity/accommodation/](http://www2.carleton.ca/equity/accommodation/)
Religious obligation: write to me with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. For more details visit the Equity Services website http://www2.carleton.ca/equity/accommodation/

Academic Accommodations for Students with Disabilities: The Paul Menton Centre for Students with Disabilities (PMC) provides services to students with Learning Disabilities (LD), psychiatric/mental health disabilities, Attention Deficit Hyperactivity Disorder (ADHD), Autism Spectrum Disorders (ASD), chronic medical conditions, and impairments in mobility, hearing, and vision. If you have a disability requiring academic accommodations in this course, please contact PMC at +1613-520-6608 or pmc@carleton.ca for a formal evaluation. If you are already registered with the PMC, contact your PMC coordinator to send me your Letter of Accommodation at the beginning of the term, and no later than two weeks before the first in-class scheduled test or exam requiring accommodation (if applicable). After requesting accommodation from PMC, meet with me to ensure accommodation arrangements are made. Please consult the PMC website for the deadline to request accommodations for the formally-scheduled exam (if applicable). Accommodation for Student Activities: Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. https://carleton.ca/senate/wp-content/survivors-of-sexual-violence-support

Survivors of Sexual Violence: As a community, Carleton University is committed to maintaining a positive learning, working and living environment where sexual violence will not be tolerated, and is survivors are supported through academic accommodations as per Carleton’s Sexual Violence Policy. For more information about the services available at the university and to obtain information about sexual violence and/or support, visit: carleton.ca/sexual-violence-support

Accommodation for Student Activities: Carleton University recognizes the substantial benefits, both to the individual student and for the university, that result from a student participating in activities beyond the classroom experience. Reasonable accommodation must be provided to students who compete or perform at the national or international level. Please contact your instructor with any requests for academic accommodation during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist. https://carleton.ca/senate/wp-content/uploads/Accommodation-for-Student-Activities-1.pdf

Important Dates:

First lecture .................................................. Sep 5, 2019
Last day for registration ......................................... Sep 17, 2019
Last day to withdraw from Fall term with full fee adjustment ........ Sep 30, 2019
Holiday, University closed ...................................... Oct 14, 2019
Fall break, No Classes ........................................ Oct 21-25, 2019
Midterm Exam .................................................. Nov 2, 2019
Exam accommodation request .................................... Nov 8, 2019
Last day of Fall term classes. ................................. Dec 6, 2019
Last day for academic withdrawal from Fall term ........................ Dec 6, 2019
Final exam in Fall term ........................................ Dec 9-21, 2019
**Tentative Course Outline:** The weekly coverage might change as it depends on the progress of the class. However, you must keep up with the update schedule at CuLearn.

<table>
<thead>
<tr>
<th>Week</th>
<th>Chapter</th>
<th>Content</th>
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| Week 1 | Ch1 | • What is Statistics? Population and sample. Examples of statistical problems.  
• Describing the Shape of a Distribution, Graphs for Quantitative and Qualitative Data.  
• Describing data sets by graphs, histograms, stem- and-leaf plots. |
| Week 2 | Ch2 & Ch3 | • Measures of Central Tendency (i.e Mean, Median, Mode).  
• Measures of Variation (i.e Variance, Standard deviation, Range).  
• Tchebyshieffs theorem, empirical rule.  
• Percentiles, Quartiles, and Interquartile Range.  
• Box plots, z-scores.  
• Bivariate data. |
| Week 3 | Ch4 | • Events, sample space, combination of events, probability of an event.  
• Addition rule, multiplicative rule. Venn Diagrams. Conditional probability and independence. |
| Week 4 | Ch4 | • Bayes rule. Probability distribution of a discrete random variable.  
• Expectation and variance of a discrete random variable. |
| Week 5 | Ch5 | • Binomial, Poisson, and Hypergeometric distributions.  
• Poisson approximation to the binomial |
| Week 6 | Ch6 | • Continuous distributions, Normal distribution.  
• Normal approximation to the binomial distribution. |
| Week 7 | Ch7 | • Random sampling. Sampling distributions. Central Limit Theorem.  
• Sample mean and sample proportion.  
• Sum and difference of independent random variables. |
| Week 8 | Ch8 & Ch10 | • Estimation. Large sample. Population mean.  
• Confidence intervals for the population mean Confidence intervals for the binomial proportion. |
| Week 9 | Ch8 & Ch10 | • Choosing sample size  
• Confidence intervals for difference between means.  
• Confidence intervals for difference between two binomial proportions. |
| Week 10 | Ch9 | • Introduction to Hypothesis Testing. Type I and Type II Errors.  
• p-values. Hypothesis tests about a Population Mean and Population Proportion. |
| Week 11 | Ch9 & Ch10 | • Large-sample tests for difference between two means  
• Large-sample tests for difference between two proportions. |
| Week 12 | Ch10 | • The t-distribution  
• Small-sample confidence intervals.  
• Small-sample inference for difference between two means |