

**SCHOOL OF MATHEMATICS AND STATISTICS
CARLETON UNIVERSITY**

STAT 2507 A – INTRODUCTION TO STATISTICAL MODELLING I

2021 SUMMER

CLASS SCHEDULE AND MODALITY (BLENDED)	Lectures: Mondays (Synchronous/Live at Zoom) and Wednesdays (Asynchronous/Pre-recorded) (6:05 to 7:25 p.m.) Labs: A1 – Mondays (5:05 to 5:55 p.m.) A2 – Wednesdays (5:05 to 5:55 p.m.) A3 – Mondays (7:35 to 8:25 p.m.) A4 – Wednesdays (7:35 to 8:25 p.m.) A5 – Mondays (8:35 to 9:25 p.m.) A6 – Wednesdays (8:35 to 9:25 p.m.) (Synchronous)
INSTRUCTOR	Tanvir Quadir E-mail: tanvir.quadir@carleton.ca Brightspace at https://brightspace.carleton.ca
OFFICE HOURS	Tuesdays (6:00 – 7:00 pm) (Availability: during office hours or via e-mail)
TEACHING ASSISTANTS	TBA

COURSE DESCRIPTION:

A data-driven introduction to statistics. 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.

Precludes additional credit for BIT 2000, BIT 2100 (no longer offered), BIT 2300 (no longer offered), ECON 2201 (no longer offered), ECON 2210, ENST 2006, GEOG 2006, STAT 2606, and STAT 3502. May not be counted for credit in any program if taken after successful completion of STAT 2559.

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

The course consists of lectures 3 hours a week, and labs 1 hour a week. The laboratory sessions will give students hands-on experience of solving problems based on the topics covered in the classes. **The meeting links of lectures and laboratory (Zoom/BigBlueButton) will be available at the course website at Brightspace. Attendance at the first class on Monday, May 10 is mandatory.**

DATA ANALYSIS AND SPSS: Students are required to use statistical software SPSS for their assignments. Data used for assignment/examples are provided at Brightspace. You need to use SPSS by connecting to VDI (Virtual Desktop Interface) through VMWare Horizon Client or HTML. <https://cudesktop.carleton.ca>

EVALUATION ITEM AND DATES:

Item	Chapters and Deadlines	Weight
Quizzes	Quiz 1: Week 1 - 4 (Due on June 13, 2021) Quiz 2: Week 5 - 7 (Due on July 4, 2021) Quiz 3: Week 8 - 12 (Due on August 8, 2021)	15%
Assignments	Assignment 1: Week 1 - 5 (Due on Wednesday, June 23, 2021) Assignment 2: Week 6 - 10 (Due on Wednesday, July 28, 2021)	15%
Midterm Examination	Midterm: Sunday, June 27, 2021 (2 - 4 pm) (Week 1 – 5)	25%
Final Examination	Between August 19 - 25, 2021 (TBA by the Registrar’s Office)	45%

REQUIRED TEXTBOOK:

Introduction to Probability and Statistics by Mendenhall, Beaver, Beaver and Ahmed, 4th Canadian edition, Nelson. *Student Solutions Manual* for use with the textbook is also recommended.

EVALUATION CRITERIA:

QUIZZES (15%) - DUE AT BRIGHTSPACE ON ASSIGNED DATES: The three quizzes will be counted towards the course total where each quiz is equally weighted. All quizzes will take place at Brightspace.

MIDTERM EXAMINATION (25%): Midterm examination will be held at Brightspace on Sunday, June 27, 2021 from 2 p.m. to 4 p.m. There is no deferred midterm. If you miss a midterm exam and provide a self-declaration form (<https://carleton.ca/registrar/wp-content/uploads/self-declaration.pdf>) within one week of the missed exam, the assigned weight (of 25%) will be added to your final exam; otherwise a mark of zero is assigned. Students will need to fill out the form “Consent to Release Information to a Third Party” (which is available at Brightspace) when they submit a medical note.

ASSIGNMENT (15%) – DUE AT BRIGHTSPACE ON ASSIGNED DATES: There will be two assignments, each counting equally toward the term mark. No late assignments will be accepted. Students may wish to work together on assignments, but each student must write up his/her assignment independently.

FINAL EXAMINATION (45%): The 3-hour final examination will take place at Brightspace during the official final examination period of August 19 to 25, 2021, and is scheduled by the Registrar’s Office. Please do not make travel plans prior to August 25, 2021. If you miss the final examination, please contact the Registrar’s Office as soon as possible after the missed exam to qualify for a deferred exam next semester.

Please note that no evaluations of this course will be e-proctored. Moreover, all quizzes, midterm, and final exams will be open-book and use “sequential navigation” method.

TENTATIVE COURSE SCHEDULE (MAY BE ADJUSTED AS COURSE UNFOLDS):

<i>Week</i>	<i>Date</i>	<i>Topics</i>	<i>Sections</i>
1	May 10 – 14	Population and sample. Variables and data. Types of variables. Graphs for Categorical and Quantitative Data.	Introduction, 1.1 – 1.5
2	May 17 – 21	Measures of centre and variability. Tchebysheff's theorem and Empirical Rule. Measures of relative standing. Percentiles, quartiles, Box plots. Outlier.	2.1 – 2.7
3	May 24 – 28	Bivariate data. Graphs for qualitative and quantitative bivariate data. Correlation and regression. Probability, events, and sample space.	3.1 – 3.4, 4.1 – 4.3
4	May 31 – June 4	Counting rules. Event relations and Probability rules. Independence, Conditional Probability, and Multiplication rule. Bayes' Rule.	4.4 – 4.7
5	June 7 – 11	Discrete random variables and their probability distributions. Uniform, Bernoulli, Binomial, Poisson, and Hypergeometric distributions.	4.8, 5.1 – 5.4
6	June 14 – 18	Probability Distributions for Continuous Random Variables. Uniform, Exponential, and Normal distributions. Review for Midterm Exam (Week 1 – 5).	6.1 – 6.3
7	June 21 – 25	Normal approximation to Binomial probability distribution. Random sampling. Sampling distributions. Central Limit Theorem. Sample mean and sample proportion. Sum and difference of independent random variables.	6.4, 7.1 – 7.6
8	June 28 – July 2	Large sample estimation: Point and interval estimates for a population mean and proportion. Choosing Sample Size.	8.1 – 8.4, 8.8
9	July 5 – 9	Student's t distribution. Small sample estimation: Point and interval estimate for a population mean.	10.1 – 10.3
10	July 12 – 16	Large and small sample estimation: Point and interval estimates for the difference between two population means and proportions. One-sided Confidence Bounds.	8.5 – 8.6, 8.7, 10.4 – 10.5
11	July 19 – 23	Test of hypothesis. Type-I and Type-II errors. Power of a Test. Large-sample tests of one and two population means.	9.1 – 9.4
12	July 26 – 30	Large-sample tests of one and two population proportions.	9.5 - 9.6
13	August 2 – 6	Small sample tests of one and two population means: Independent and paired samples.	10.4 - 10.5
14	August 9 – 13	Small sample tests of one and two population means: Independent and paired samples (cont'd). Review for Final Exam (Part I)	10.4 - 10.5
15	August 16	Review for Final Exam (Part II)	

ADDITIONAL INFORMATION:

MATHEMATICS AND STATISTICS LEARNING ASSISTANCE PROGRAM (MS-LAP):

MS-LAP supports first year mathematics and statistics courses. This free-of-charge program helps students in achieving their goals. It provides learning support and solutions to homework questions through assistance videos.

MS-LAP gives students tools to succeed while explaining step-by-step strategies and associated theories for particular problem. The program is for anyone who wants to deepen their understanding at the own pace, and in the comfort and privacy of their home.

COURSE STANDING: Standing in a course is determined by the course instructor subject to the approval of the Faculty Dean. This means that grades submitted by the instructor may be subject to revision. No grades are final until they have been approved by the Dean.

ACADEMIC INTEGRITY: Students should familiarize themselves with the Carleton University policy on Academic Integrity. This policy details those behaviours considered to be violations of academic integrity (e.g., cheating, plagiarism) and provides guidelines as to the imposition of various sanctions, including a reduction in grade, suspension, and expulsion. Also be aware of the academic integrity policy on the registrar website page at <https://carleton.ca/registrar/academic-integrity/>

IMPORTANT DEADLINES: May 20, 2021 is the last day to register for the course; May 21, 2021 is the last day to withdraw with a full fee adjustment; and July 23, 2021 is the last day to withdraw without academic penalty. The deferred examination will take place between September 17 – 19, 2021.

STUDENTS REQUIRING SPECIAL ACCOMMODATION:

FOR STUDENTS WITH DISABILITIES: Students with disabilities requiring academic accommodations are encouraged to contact a coordinator at the Paul Menton Centre (PMC) for Students with Disabilities (613-520-6608) or pmc@carleton.ca to complete the necessary *letters of accommodation*. After registering with the Centre, please set up an appointment with the instructor to discuss your needs at least two weeks prior to the in-class mid-term examination.

FOR RELIGIOUS OBSERVANCE: Students requesting academic accommodation based on religious observance should make a formal, written request to their instructor for alternate dates and/or means of satisfying academic requirements. Such requests should be made during the first two weeks of class, or as soon as possible after the need for accommodation is known to exist, but no later than two weeks before the compulsory academic event.

Students who have questions or want to confirm accommodation eligibility of a religious event or practice may refer to the Equity Services website for a list of holidays and Carleton's Academic Accommodation policies or may contact an Equity Services Advisor in the Equity Services Department for assistance (ext. 5622).

FOR PREGNANCY: Pregnant students requiring academic accommodations are encouraged to contact an Equity Advisor in Equity Services (ext. 5622) to complete a letter of accommodation. The

student must then make an appointment to discuss her needs with the instructor at least two weeks prior to the first academic event in which it is anticipated the accommodation will be required.

FOR STUDENTS WITH DISABILITIES	Contact Paul Menton Centre (ext. 6608) to obtain letters of accommodations
FOR RELIGIOUS OBLIGATIONS	To be worked out on individual basis with instructor. Consult Equity Services Website or an Equity Advisor (ext. 5622) for Policy and list of holidays (www.carleton.ca/equity)
FOR PREGNANCY	Contact Equity Services (ext. 5622) to obtain letters of accommodations

ADDITIONAL STUDENT SUPPORT INFORMATION:

Carleton University offers additional support at the Writing Tutorial Service (215PA), Student Life Services (501 Unicentre), and the Student Academic Success Centre (302 Tory).