**Department of Mathematics & Statistics**
**Concordia University**

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**STAT 249**
Probability I
*Fall 2020*

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Instructor\*: _____

Email: _____

Office Hours: _____

\*Students should get the above information from their instructor during class time.  The instructor is the person to contact should there be any questions about the course.

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| **Preface:** | **Due to exceptional circumstances, this course will be taught and all assessments will be done completely ONLINE.  Given the subject matter and nature of this course, at least one of the exams, including the midterm and/or the final exam will be given online through the Concordia Online Exams (COLE) platform with online proctoring.  For more details see the ADDENDUM at the end of this course outline.** |
| **Lectures:** | The content of the lectures will be provided asynchronously online via Moodle in the form of written notes.   Synchronous attendance of lectures via Zoom is not compulsory and will be used for aiding comprehension of lecture contents via discussion, polls and exercises (see course Moodle page for Zoom link/meeting-ID#). |
| **Office Hours:** | TBA. All questions will be answered during lectures or privately immediately   after in Zoom breakout-room.   An online discussion platform on Moodle will be used for students to ask questions asynchronously, exchange information and interact with their peers. Announcements of all important clarifications  and corrections will be made on Moodle. |
| **Text:** | *Mathematical Statistics with Applications*, 7th Edition, by D. D. Wackerly, W. Mendenhall III and R. L. Scheaffer, Duxbury Press, 2008. The digital version of the textbook will be available at: https://www.co-opbookstore.ca/service/textbooks/ The print version of the textbook will be available at: https://www.bkstr.com/concordiastore/home **Note:** Students should order textbooks as early as possible, especially for print versions in case books are backordered or there are any shipping delays. |

**Supplement Text:** *Introduction to Probability & Statistics for Engineers and Scientists*, by Sheldon M. Ross, Academic Press.

**Calculators:** Only calculators approved by the Department such as **Sharp EL 531** or the **Casio FX 300MS** are permitted for the class test and final examination.
For a list of Approved and Not-Approved calculators see:
http://www.concordia.ca/artsci/math-stats/services.html#calculators.

**Assignments:** Assignments and their due dates will be provided via Moodle; students are required to submit each assignments as a single pdf file on Moodle. **Late assignments will not be accepted.**

**Test:** **A COLE proctored** midterm test will be given online during lecture time. The exam will be a closed book (provided aids only) exam. Only **one midterm** test will be held during the **7th or 8th week** (to be specified by the professor).

NOTE: It is the Department's policy that tests missed for any reason, **including illness,** cannot be made up. If you miss the midterm test **because of illness** *(medical note required)* the final exam will count for 80% of your final grade, and the assignments will count for the remaining 20%.

**Final Exam:** **COLE proctored** final exam will be given online during the two-hour period assigned by Concordia's Exams Office. The exam will be a closed book (provided aids only) exam. (see Moodle page for Concordia Online Exam rules).

NOTE: Students are responsible for finding out the date and time of the final exams once the schedule is posted by the Examinations Office. Conflicts or problems with the scheduling of the final exam must be reported directly to **the Examinations Office, not to your instructor**. It is the Department's policy and the Examinations Office's policy that **students are to be available until the end of the final exam period.** Conflicts due to travel plans will not be accommodated.

**Final Grade:** The final grade will be based on the following components:

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| **Assignments** | **20**% |
| **Mid-term Test** | **30**% |
| **Final Exam** | **50**% |

If the grading scheme for this course includes graded assignments, a reasonable and representative subset of each assignment may be graded. Students will not be told in advance which subset of the assigned problems will be marked and should therefore attempt all assigned problems.

**Notes:**      **(1)  Please note that there is no "100% Final Exam" option in this course.**

**(2)**  A Mid-term test missed for any reason, cannot be made up.   If you miss a mid-term test because of illness (to be confirmed with a valid medical note), the final exam can count for 80% of your final grade.

**(3)**  In order to obtain a good grade, the student **MUST** show that they have a **THOROUGH** understanding of the subject and can fully explain their reasoning process in the context of problem solutions.

**(4)**  The final exam will cover all the material taught within the entire term.

| Week | Sections of the Text | Topics |
|------|---------------------|--------|
| 1 | Section: 2.3, 2.4, 2.5 | Set Notation, Discrete Probability Model, Computing Probability (Sample Point Method) |
| 2 | Section: 2.6, 2.7 | Counting Methods, Conditional Probability, Independence of Events |
| 3 | Section: 2.8, 2.9, 2.10 | Laws of Probability, Computing Probability (Event Composition Method), The Total Law of Probability and Bayes Rule |
| 4 | Section: 2.11, 3.1, 3.2 | Numerical Events and Random Variables, Discrete Random Variable, Probability Distribution of a Discrete Random Variable |
| 5 | Section: 3.3, 3.4 | Expected Value of a Random Variable or a Function of a Random Variable, The Binomial Probability Distribution |
| 6 | Section: 3.5, 3.6 | The Geometric Probability Distribution, The Negative Binomial Probability Distribution |
| 7 | Section: 3.7, 3.8, 3.9 | The Hypergeometric Probability Distribution, The Poisson Probability Distribution, Moments and Moment-Generating Functions |
| 8 | Section: 3.10, 3.11, 4.2 | Probability-Generating Functions, Tchebysheff's Theorem, The Probability Distribution for a Continuous Random Variable |
| 9 | Section: 4.3, 4.4 | Expected Values for Continuous Random Variables, The Uniform Probability Distribution |
| 10 | Section: 4.5, 4.6 | The Normal Probability Distribution, The Gamma Probability Distribution |
| 11 | Section: 4.7, 4.9,  4.10 | The Beta Probability Distribution, Other Expected Values, Tchebysheff's Theorem |

| 12 | Section: 4.11, 5.2, 5.3 | Expectations of Discontinuous Functions and Mixed Probability Distributions, Bivariate and Multivariate Probability Distributions, Marginal and Conditional Probability Distributions |
| 13 | Section: 5.4, 5.5 <br> **Review** | Independent Random Variables, The Expected Value of a Function of Random Variables |

**Academic Integrity and the Academic Code of Conduct**
This course is governed by Concordia University's policies on Academic Integrity and the Academic Code of Conduct as set forth in the Undergraduate Calendar and the Graduate Calendar. Students are expected to familiarize themselves with these policies and conduct themselves accordingly. "Concordia University has several resources available to students to better understand and uphold academic integrity. Concordia's website on academic integrity can be found at the following address, which also includes links to each Faculty and the School of Graduate Studies: concordia.ca/students/academic-integrity." *[Undergraduate Calendar, Sec 17.10.2]*

Content belonging to instructors shared in online courses, including, but not limited to, online lectures, course notes, and video recordings of classes remain the intellectual property of the faculty member. It may not be distributed, published or broadcast, in whole or in part, without the express permission of the faculty member. Students are also forbidden to use their own means of recording any elements of an online class or lecture without express permission of the instructor. Any unauthorized sharing of course content may constitute a breach of the Academic Code of Conduct and/or the Code of Rights and Responsibilities.

**Disclaimer:** In the event of extraordinary circumstances beyond the University's control, the content and/or evaluation scheme in the course is subject to change.

**Addendum:** This course will be taught and all assessments will be completely online. A midterm and/or a final online exam will be provided through the Concordia Online Exams (COLE) platform with online proctoring (also known as auto-proctoring). More information about the COLE system may be found at the COLE website.

Please note the following respect to online proctored exams:

- That the exam will take place during the exam period at the designated date and time set by the professor (midterm) or the Exams office (final). All exam times will be set to Eastern Standard/Daylight Time.
- That your image, voice and screen activity will be recorded throughout the duration of the exam.
- That you must show your Concordia University Identification card to validate your identity. Alternative government issued photo identification will be accepted, though it is not recommended. Only identification in English or French will be accepted.
- That any recording made will only be viewed by authorized university personnel (no external entity has authorization to review the recording).

- That you will be responsible for ensuring appropriate, properly functioning technology (webcam, a microphone, appropriate browser and an ability to download any necessary software, as well as a reliable internet connection with a minimum of a 3G connection).
- That you are very **strongly recommended** to enter the virtual test site found at the COLE website and become familiar with the software that will be used for your exam before starting the exam.
- That you will need a quiet place within which to take the exam. Earplugs or noise-cancelling headphones that are not connected to a device may also be used to allow you to focus for the duration of the exam.

Students who are unable to write an exam because they are unable to meet the above conditions and requirements are advised that they will need to drop the course. More information can be provided on the next offering of this course by consulting the Department. Students are advised that the drop deadline (DNE) for this course is September 21, 2020.

Students who require additional accommodations for their exams due to a documented disability should contact the Access Centre for Students with Disabilities as soon as possible (acsdinfo@concordia.ca).

If you face issues during the exam, you should inform your professor of those issues immediately. Please note that there are in-exam supports you should spend time getting to know. Visit the COLE website for more information.