UNIVERSITY OF TORONTO
DEPARTMENT OF STATISTICAL SCIENCES
STA248H1 S LEC0101 (STA248H1: Statistics for Computer Scientists),
Winter 2022

All listed times in this document are in local Toronto time. If you are in a different time zone, you are responsible for any time conversions.

1 COURSE DESCRIPTION

Syllabus: An introduction to statistical inference and practice needed for computer science applications. Statistical models and parameters, estimators of parameters and their statistical properties, methods of estimation, confidence intervals, hypothesis testing, likelihood function, the linear model. Use of statistical computation for data analysis and simulation.

Important announcements, tutorial problem sets, modules, and other course information will be posted on the course web page of Quercus. It is an online platform to learn this course effectively.

Prerequisite: STA237H1/STA247H1/STA257H1/STA256H5/STAB52H3;
CSC111H1/CSC148H1/CSCA48H3/CSC148H5
Exclusion: ECO220Y1/ ECO227Y1/ GGR270H1/ PSY201H1/ SOC300H1/ SOC202H1/ SOC252H1/ STA220H1/ STA221H1/ STA255H1/ STA238H1/ STA261H1/ STA288H1/ EEB225H1/ STAB22H3/ STAB27H3/ STAB57H3/ STA220H5/ STA221H5/ STA258H5/ STA260H5/ ECO220Y5/ ECO227Y5

Breadth Requirements: The Physical and Mathematical Universes (5)

2 COURSE SCHEDULE

We will use the scheduled lecture times Tuesdays 10am - 12noon. Lectures will be delivered online and tutorials will be offered in-person or online sections – Thursdays 10am - 12noon depending on the tutorial section in which you enrol. However, we will switch these sessions to online for a temporary period based on advice of University of Toronto. These announcements will be regularly posted on the course web page of Quercus.

All assessments will be completed through online. Virtual lectures will be held via Microsoft Teams and this link will be posted on Quercus page.

3 INSTRUCTOR

Selvakkadunko Selvaratnam (Selva)
Email for this course: sta248@utoronto.ca
PhD in Statistics, Memorial University of Newfoundland
Assistant Professor(teaching stream), Department of Statistical Sciences, University of Toronto.

4 OFFICE HOURS:

Will be posted on Quercus, held via Microsoft Teams or Zoom and the link will be available on Quercus.

5 TEXTBOOKS

(1) Modern Mathematical Statistics with Applications, 2021, by Devore, J.L., Berk, K.N., Carlton, M.A.

You can access a digital textbook from the online library of the University of Toronto by clicking
`https://link-springer-com.myaccess.library.utoronto.ca/book/10.1007%2F978-3-030-55156-8`

(2) A Modern Introduction to Probability and Statistics: Understanding Why and How, 2005, by Dekking, F.M., Kraaikamp, C., Lopuhaa, H.P., and Meester, L.E.

You can access a digital textbook from the online library of the University of Toronto by clicking
`https://books-scholarsportal-info.myaccess.library.utoronto.ca/en/read?id=/ebooks/ebooks2/springer/2011-04-28/3/1846281687#page=1`

(3) Probability: With Applications and R, 2021, by Wagaman, A. S., and Dobrow, R. P.

(4) The Elements of Statistical Learning: Data Mining, Inference, and Prediction, Second Edition, Hastie, T., Tibshirani, R., Friedman, J.

6 COURSE STRUCTURE

Quercus Page: All lecture slides, video recordings, quizzes/tests/assignments, and other course materials will be posted on Quercus under Modules. Course materials provided on Quercus are for the use of students currently enrolled in this course only. Distributing course materials to anyone outside of the course is considered unauthorized use.

Assignments: Assignments will be submitted through Crowdmark.

- All assignments must be submitted on Crowdmark to pass this course. If a student fails to submit his/her assignment, the student will get 0 points to the assignment. There are no deferred assignment.

- A penalty of 5% for every hour will be provided for a late assignment. For example, if an assignment submitted 10 minutes after the due date and time, there would be a penalty of 5% on the assignment grade (i.e. $90\% \rightarrow 85\%$).

- Students should upload answers for each question of the assignment on the appropriate section of Crowdmark by 1700 (5:00pm) on their respective due dates.

Quizzes: will be held during lecture sessions. The duration of each quiz will be 45 minutes. Each quiz will be held at the end of lecture session.

Tutorials: We will use the scheduled tutorial times Thursdays 10am -12 noon. Tutorials will be started on 27 January 2022. Marks will be assigned for tutorial activities. You should submit your works for tutorial activities on Crowdmark before deadline. The instructions will be given on Crowdmark for each week.

7 TENTATIVE LECTURE GUIDE

	Week of		Topics
1	Jan. 10	Module 1	Statistics and Sampling Distributions
2	Jan. 17	Module 2	Point Estimation
3	Jan. 24	Module 3	Statistical Intervals Based on a Single Sample
4	Jan. 31	Module 4	Tests of Hypotheses Based on a Single Sample
5	Feb. 7	Module 5	Inferences Based on Two Samples
6	Feb. 14		Midterm exam
7	Feb. 21		Reading week
8	Feb. 28	Module 6	Regression and Correlation
9	Mar. 7	Module 7	Regression in machine learning
10	Mar. 14	Module 8	The Analysis of Variance
11	Mar. 21	Module 9	Logistic Regression
12	Mar. 28	Module 10	Classification in machine learning
13	Apr. 4		Review

8 EVALUATION

The course mark will be computed based on the following method,

Types	Weight of total marks	Date
Assignment 1	6.5%	Friday, February 11 at 5.00pm
Assignment 2	7%	Friday, March 18 at 5.00pm
Assignment 3	7%	Friday, April 8 at 5.00pm
Quiz 1	4%	January 25, 11:10am - 11:55am
Quiz 2	4%	March 8, 11:10am - 11:55am
Quiz 3	4%	March 22, 11:10am - 11:55am
Quiz 4	4%	April 5, 11:10am - 11:55am
Tutorial Activities (9)	$(9 \times 1.5\% =)$ 13.5%	During tutorial sessions
Midterm Exam	20%	Tuesday, February 15, 10am - noon
Final Exam	30%	TBD, will be held during the Final Examination Period

9 MISSED COMPONENTS

Term Exams and Assignments: There are no deferred term exams or term assignments. Final exam will cover the entire course. There will be no make-up midterm exam or assignments or quizzes

or tutorials. Students who miss any term exams or tutorial activities for a valid reason, will have the percentage of this assessment added to the percentage of the final exam. **At most one missed assessment can be added to the percentage of the final exam.** But, you should email to me within one week from the date of the assessment. **All assignments must be submitted on Crowdmark to pass this course.** If a student fails to submit his/her assignment, the student will get 0 points to the assignment.

10 REGRADE POLICY

All assessments except the final assessment: Firstly, you should review Marking schemes/solutions before requesting a reread. If you still have concerns about your grading, complete "Term Assessment Regrade form" on Quercus and send it to me through email no later than 1 week after an assessment has been released back to you. Late requests will not be accepted.

Final examination: You can view your final exam when you book an appointment with the Statistics Undergraduate Office. Available dates will be informed at the end of the final exam. To request a regrade for your final exam, please carefully read and complete the "DoSS Regrade Request Form" on Quercus and submit it to the Undergraduate Statistics Office at ug.statistics@utoronto.ca. The deadline to submit your request will be announced at the end of the final exam on Quercus.

11 IMPORTANT DATES

First Day of Classes	January 10
Last day to enrol in S courses	January 23
Fall Reading Week	February 22 - 25
Last Day of Classes	April 8
Final Exam Periods	April 11 - 29

12 COURSE CONDUCT

- **Email:** Any administrative questions regarding the course can be addressed by me via email (sta248@utoronto.ca). Questions regarding course material and concepts should be addressed in office hours/Piazza.

  All students are given a UToronto email address. This email address is available to the course instructor who may distribute relevant course information or announcements via email. The University regularly communicates with students via email. Check your UToronto email regularly or forward it to an email address that you check regularly. If you use email to communicate with your instructor, you must use your UToronto account. This is to protect your privacy: if a non-UToronto account is used, there is no way for the instructor to verify the identity of the sender.

- **Programming Languages:** RStudio (free download from `https://www.rstudio.com/`) and Python Softwares will be regularly used in this course. Also, you can use a cloud-based version of RStudio and Python at U of T by using the link: `https://jupyter.utoronto.ca/`. Instructions using RStudio and Python will be provided during lecture sessions, and initial codes will be provided where appropriate. By the end of the course, you are expected to apply RStudio and Python to solve problems.

- **Recording and/or Distribution of Course Materials:** Audio or video recording, digital or otherwise, of lectures, tutorials, seminars or any other teaching environment by students is allowed only with the prior written consent of the instructor or as a part of an approved accommodation plan. Student or instructor content, digital or otherwise, created and/or used within the context of the course is to be used solely for personal study, and is not to be used or distributed for any other purpose without prior written consent from the content author(s).

13 ACCESSIBILITY SERVICES

The University of Toronto provides accommodations through accessibility services to students with diverse learning styles and needs. If you have a disability or health consideration that may require accommodations, please feel free to reach out to Accessibility Services at 416-978-8060 or through accessibility.utoronto.ca.

14 STUDENT RESPONSIBILITIES

Academic Integrity: Participating honestly, respectfully, responsibly, and fairly in this academic community ensures that the University of Toronto degree that you earn will be valued as a true indication of your individual academic achievement, and will continue to receive the respect and recognition it deserves. Familiarize yourself with the University of Toronto's Code of Behaviour on Academic Matter. Potential offences include, but are not limited to:

- Obtaining or providing unauthorized assistance on any exam/quiz/assignment/tutorial including:

    (i) working in groups on individual assessments, including giving hints to the answer!
    (ii) having someone rewrite, edit, or add material to your independent work
    (iii) researching for inspiration, hints, or answers to any graded problem
    (iv) posting active assessment questions on discussion boards/private tutoring companies for hints/solutions

- Lending your work to a classmate who submits it as their own with or without your permission. The University of Toronto treats cases of academic misconduct very seriously. All suspected cases of academic dishonesty will be investigated following the procedures outlined in the Code. The consequences for academic misconduct can be severe, including a failure in the course and a notation on your transcript. If you have any questions about what is or is not permitted in this course, please do not hesitate to contact the instructor. If you are experiencing personal challenges that are having an impact on your academic work, please speak to the instructor or seek the advice of your college registrar.