

2 STA255 Statistical Theory, Syllabus, Summer 2018

Saturday, July 14, 2018 23:54

STA255H1 (Statistical Theory) Syllabus – Summer 2018

Lectures

Tuesday 7-10 pm in PB B250
Thursday 7-10 pm in PB B250

Tutorials

Tuesday 6-7 pm in SS 1084, 1086, 1088
Thursday 6-7 pm in SS 1084, 1086, 1088

Instructor : Boris Garbuzov

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Office hours: Monday 18-19:00, room 623 basement of SS building

Teaching assistants' emails and office hours:

Hamed Zakeri, hamed.zakeri@mail.utoronto.ca, Thursday 10-11 am

Vatsal Desai, vatsal.desai@mail.utoronto.ca, Friday 5-6 pm

Daniel Flam, dan.flam.shepherd@mail.utoronto.ca, Tuesdays 10-11 am

Content description

This course deals with the mathematical aspects of some of the topics discussed in STA220H1. Topics include discrete and continuous probability distributions, conditional probability, expectation, sampling distributions, estimation and testing (Note: STA255H1 does not count as a distribution requirement course).

Prerequisites: STA220H1/STA221H1/ECO220Y1 (note: ECO220Y1 may be taken as a co-requisite), MAT133Y1(70%)/(MAT135H1,MAT136H1)/MAT137Y1/MAT157Y1

Exclusion: ECO227Y1/STA257H1/STA261H1/STA247H1/STA248H1

NOTE: The prerequisites are strictly enforced in this course. Special permission to take STA255 will NOT be granted to anyone without the required statistics and calculus courses (or equivalent transfer credits). You will be removed from the course by the department if you do not have the necessary prerequisites.

Course learning outcomes

1. In this course you will:
2. model random phenomenon using a variety of discrete and continuous probability distributions,
3. use probability distributions to compute probabilities and expected values,
4. determine characteristics of random variables (and functions of random variables) using calculus and simulation,
5. derive point and interval estimators for STA220 inference procedures and explore their properties, and
6. interpret results from STA220-level statistical inference procedures and recognize potential limitations.

Textbook

Devore & Berk (2012) Modern Mathematical Statistics with Applications. 2nd Edition, Springer. An electronic version is available free-of-charge through the University of Toronto Libraries:

<http://search.library.utoronto.ca/details?8331046&uuiid=f5b471dd-de62-4a29-8cd5->

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Alternatively, a hard copy is available for purchase through the Bookstore. The course follows this text literally, so there are no additional slides posted.

Statistical software - R

R is a popular open source statistical package that is widely used in both academia and industry. It is available for free download from: <http://cran.ca.r-project.org> for use on Windows, Mac OS X, and Linux (there's even a version on Android). You are strongly encouraged to download R so you can use it for this course. You will need to be familiar with R code and output to follow along in class and to interpret it on your STA255 quizzes/exams.

Quercus (Canvas) course site

We will be using a new learning management system that is similar to Blackboard (called Canvas). The University of Toronto will be moving from "Portal" to "Quercus" in Fall, 2018, and STA255 has been selected for early adoption.

Tutorials

There will be six (6) one-hour tutorial sessions during the term (starting July 12). The purpose of these tutorials is to provide you with an opportunity to work through problems applying the material learned in class with support from your TA and your peers to deepen your understanding of the course concepts. Although there are no grades for attendance / participation in your tutorials nor tutorial quizzes / assignments, you are strongly encouraged to attend your tutorials regularly and to ask your TA questions during tutorial.

Grading scheme

Quiz 1 - 10%

Quiz 2 - 10%

Quiz 3 - 10%

Assignment - 20%

Final - 50%

Final exam

There will be a 3-hour exam (mix of multiple-choice and written answers). You must bring your student identification to the final exam. Information on coverage, along with some sample questions will be posted on Quercus in advance.

Final exam conflicts (see <http://www.artsci.utoronto.ca/current/exams/conflicts>) and petitions for a deferred exam must be brought to the Faculty of Arts and Science, not your instructor. Information on how to request a deferred exam due to illness or another valid reason is available at:

<http://www.artsci.utoronto.ca/current/petitions/common#deferred>

Calculators

A non-programmable calculator may be useful for the midterm and/or final exam. Any basic calculator will be sufficient (no special functions are necessary). Calculators on phones or other devices equipped to communicate with the outside world (for example, through the internet or cellular or satellite phone networks) will not be permitted during the midterm and final exam.

Marking concerns with quizzes or the assignment

Any requests to have a quiz or assignment question regraded must be made in writing directly to your instructor through Quercus (email STA 255 "Teachers" through the Inbox in Quercus)

within one week of the date the marks were posted on Quercus. To be considered, your message must clearly identify the question you have concerns about, contain a detailed justification for your concern and make specific references to your answer and to the relevant course material. Keep in mind that it is possible for your assignment grade to go down if the regraded mark is lower than your original assignment grade.

Accommodations for missed quizzes

1. If a quiz or your midterm is missed for a valid medical reason, you must email your instructor through Quercus (i.e., email STA 255 "Teachers" in Inbox) immediately, then submit the University of Toronto Verification of Student Illness or Injury form (<http://www.illnessverification.utoronto.ca>) to your instructor through Quercus (i.e., email STA 255 "Teachers" in Inbox) within one week of the quiz. The form will only be accepted as valid if the form is filled out according to the instructions on the form. The form must indicate that the degree of incapacitation on academic functioning is moderate, serious, or severe in order to be considered a valid medical reason.
2. If the form indicates that the degree of incapacitation on academic functioning is negligible or mild or does not cover the quiz availability period, then this will NOT be considered a valid medical reason.
3. Other reasons for missing a midterm or quiz will require prior approval by your instructor. If approval is not granted in advance for non-medical reasons, then you will receive a grade of 0% for the missed quiz.
4. Note: If you submit a quiz, it will be assumed that you deemed yourself fit enough to
5. do so and your grade will stand as calculated. No accommodation will be made based on claims of medical, physical, or emotional distress after the fact.
6. There are no make-ups for quizzes. If accommodation is granted by the instructor for a missed quiz, the weighting for that quiz will be shifted to your final exam; otherwise 0% will be recorded for your missed quiz.

Academic integrity

You are responsible for knowing the content of the University of Toronto's Code of Behaviour on Academic Matters at

<http://www.governingcouncil.utoronto.ca/policies/behaveac.htm>.

Academic offenses will be taken very seriously and dealt with accordingly. For all of the assessments in this course, submitting another person's answer(s) as your own (whether or not they are connected to this course), or providing your own answer(s) to another student for him/her to submit as his/her own is considered as an academic offense and will be reported as such. If you have any questions about what is or is not permitted in this course, please do not hesitate to contact the instructor.

Intellectual property statement

Course material (i.e. lecture slides, quiz and midterm questions/solutions and any other supplementary course material available on Quercus) is the intellectual property of your instructor and is made available to you for your personal use in this course. Sharing, posting, selling or using this material outside of your personal use in this course is not permitted under any circumstances and is considered an infringement of intellectual property rights.

Accessibility needs

Students with diverse learning styles and needs are welcome in this course. In particular, if you have a disability/health consideration that may require accommodation, please feel free to contact Accessibility Services at (416) 978 8060; <http://accessibility.utoronto.ca>

Tentative course schedule

This is our tentative schedule for course topics. Some adjustments may be made as the course progresses, depending on the rate at which individual topics are covered.

Week 1

July 12, Thursday, lecture 1: chapter 2, probability

July 12, Thursday, tutorial 1: chapter 2, elementary probability problems

Week 2

July 17, Tuesday, lecture 2: chapter 3, discrete random variables

July 17, Tuesday, tutorial 2: chapter 2, conditional probability problems

July 19, Thursday, lecture 3: chapter 4, part 1, continuous random variables,

July 19, Thursday, tutorial 3: chapter 3, part 1, discrete random variables problems, quiz 1 (chapters 1-3.4)

Week 3

July 23, Tuesday, lecture 4: chapter 4, part 2, continuous random variables.

July 23, Tuesday, tutorial 4: chapter 3, part 2, discrete random variables problems, introduction to R

July 26, Thursday, lecture 5: chapter 5, part 1, joint probability distributions.

July 26, Thursday, tutorial 5: chapter 4, part 1, continuous probability distributions problems, quiz 2 (chapter 3 part 2, chapter 4 part 1)

Week 4

July 31, Tuesday, lecture 6: chapter 5, part 2, joint probability distributions. Assignment posted.

July 31, Tuesday, tutorial 6: chapter 4, part 2, continuous probability distributions problems

August 2, Thursday, lecture 7: chapter 6, part 1, statistics and sampling distributions.

August 2, Thursday, tutorial 7: chapter 5, part 1, joint probability distributions, quiz 3 (chapter 4 part 2, chapter 5 part 1)

Week 5

August 7, Tuesday, lecture 8: chapter 6, part 2, statistics and sampling distributions.

August 7, Tuesday, tutorial 8: chapter 5, part 2, joint probability distributions problems

August 9, Thursday, lecture 9: chapter 7, part 1, point estimation

August 9, Thursday, tutorial 9: chapter 6, part 1, statistics and sampling distributions problems. Assignment collected.

There may or may not be a make up lecture on August 14.

Final Exam to be scheduled by the Faculty of Arts and Science