DALHOUSIE UNIVERSITY

Faculty of Science Course Syllabus
Department of Mathematics and Statistics
STAT/MATH 4066
Advanced Statistical Theory
Fall 2018

Instructor(s): Dr. Edward Susko, Edward.Susko@gmal.com, Chase 213

Lectures: MWF 2:30-3:30, Chase 319

Course Description

This class, together with STAT 5067.03 provides a solid basis in the theory of statistical inference. After a review of some probability and distribution theory, the Bayesian and classical theories of estimation and testing are introduced.

Course Prerequisites

STAT3460 or instructor's consent

Course Objectives/Learning Outcomes

In statistical settings where transformations of random variables are of interest, the students will be able to derive properties of the probability distributions of the transformations. The student will understand the different between parametric and nonparametric statistical methods. The student will understand how decision theory is used to define optimal estimation and how to derive optimal estimators and predictors. Given a statistical model, the student will know how to apply the major parametric statistical methods for estimation. Given a quantity of interest in a population, the student will know how to obtain a non-parametric estimator of the quantity. The student will understand how uniformly minimum variance unbiased estimation gives a different criteria for optimal estimation than decision theory and how to determine if an estimator is uniformly minimum variance unbiased. Given a hypothesis test of interest, the student will know how to determine whether a uniformly most powerful statistical test exists and what the test is. The student will know how to use optimal tests to derive optimal confidence interval construction procedures.

Course Materials

- Mathematical Statistics: Basic Ideas and Selected Topics (2nd Edition). Peter J. Bickel and Kjell A. Doksum.
- http://www.mathstat.dal.ca/~tsusko/sta4066.shtml

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Course Assessment

Component	Weight (% of final grade)	Date
Midterm	20%	Mon, Oct 29, 2:30-4:00
Final exam	30%	Mon, Dec 10, 9:30-12:30
Assignments	50%	9-10 weekly assignments

Conversion of numerical grades to Final Letter Grades follows the Dalhousie Common Grade Scale

A+ (90-100)	B+ (77-79)	C+ (65-69)	D (50-54)
A (85-89)	B (73-76)	C (60-64)	F (<50)
A- (80-84)	B- (70-72)	C- (55-59)	

Course Policies

Late assignments received prior to marked assignments being handed back will be accepted with a late penalty of 5%; assignments are usually handed back at the lecture after they were due. Missed tests will be written at a later date if sufficient reason can be given for missing the test.

Course Content

Probability and Distributional Theory
Statistical Models, Goals and Performance Criteria
Methods of Estimation
Measures of Performance
Testing and Confidence Bounds
Additional Topics

ACCOMMODATION POLICY FOR STUDENTS

Students may request accommodation as a result of barriers related to disability, religious obligation, or any characteristic protected under Canadian Human Rights legislation. The full text of Dalhousie's Student Accommodation Policy can be accessed here: http://www.dal.ca/dept/university_secretariat/policies/academic/student-accommodation-policy-wef-sep--1--2014.html

Students who require accommodation for classroom participation or the writing of tests and exams should make their request to the **Advising and Access Services Centre (AASC)** prior to or at the outset of the regular academic year. More information and the ***Request for Accommodation*** form are available at www.dal.ca/access.

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ACADEMIC INTEGRITY

Academic integrity, with its embodied values, is seen as a foundation of Dalhousie University. It is the responsibility of all students to be familiar with behaviours and practices associated with academic integrity. Instructors are required to forward any suspected cases of plagiarism or other forms of academic cheating to the Academic Integrity Officer for their Faculty.

The Academic Integrity website (http://academicintegrity.dal.ca) provides students and faculty with information on plagiarism and other forms of academic dishonesty, and has resources to help students succeed honestly. The full text of Dalhousie's ***Policy on Intellectual Honesty*** and ***Faculty Discipline Procedures*** is available here:

http://www.dal.ca/dept/university_secretariat/academic-integrity/academic-policies.html

STUDENT CODE OF CONDUCT

Dalhousie University has a student code of conduct, and it is expected that students will adhere to the code during their participation in lectures and other activities associated with this course. In general:

"The University treats students as adults free to organize their own personal lives, behaviour and associations subject only to the law, and to University regulations that are necessary to protect

- the integrity and proper functioning of the academic and non – academic programs and activities of the University or its faculties, schools or departments;
- the peaceful and safe enjoyment of University facilities by other members of the University and the public;
- the freedom of members of the University to participate reasonably in the programs of the University and in activities on the University's premises;
- the property of the University or its members."

The full text of the code can be found here:
http://www.dal.ca/dept/university_secretariat/policies/student-life/code-of-student-conduct.html

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SERVICES AVAILABLE TO STUDENTS

The following campus services are available to help students develop skills in library research, scientific writing, and effective study habits. The services are available to all Dalhousie students and, unless noted otherwise, are free.

Service	Support Provided	Location	Contact
General Academic Advising	Help with - understanding degree requirements and academic regulations - choosing your major - achieving your educational or career goals - dealing with academic or other difficulties	**Killam Library Ground floor** Rm G28 ***Bissett Centre for Academic Success***	In person: Killam Library Rm G28 By appointment: - e-mail: advising@dal.ca - Phone: (902) 494-3077 - Book online through MyDal
Dalhousie Libraries	Help to find books and articles for assignments Help with citing sources in the text of your paper and preparation of bibliography	**Killam Library Ground floor** Librarian offices	In person: Service Point (Ground floor) By appointment: Identify your subject librarian (URL below) and contact by email or phone to arrange a time: http://dal.beta.libguides.com/sb.php?subject_id=34328
Studying for Success (SFS)	Help to develop essential study skills through small group workshops or one-on-one coaching sessions Match to a tutor for help in course-specific content (for a reasonable fee)	**Killam Library 3rd floor** Coordinator Rm 3104 Study Coaches Rm 3103	To make an appointment: - Visit main office (Killam Library main floor, Rm G28) - Call (902) 494-3077 - email Coordinator at: sfs@dal.ca or - Simply drop in to see us during posted office hours **All information can be found on our website: www.dal.ca/sfs**
Writing Centre	Meet with coach/tutor to discuss writing assignments (e.g., lab report, research paper, thesis, poster) - Learn to integrate source material into your own work appropriately - Learn about disciplinary writing from a peer or staff member in your field	**Killam Library Ground floor** Learning Commons & Rm G25	To make an appointment: - Visit the Centre (Rm G25) and book an appointment - Call (902) 494-1963 - email writingcentre@dal.ca - Book online through MyDal We are open six days a week **See our website: writingcentre.dal.ca**