

# Course Outline Form: Winter 2016

## General Information

**Course Title:** STAT6841 - Statistical Inference (Winter)

**Course Description:**

Bayesian and likelihood methods, large sample theory, nuisance parameters, profile, conditional and marginal likelihoods, EM algorithms and other optimization methods, estimating functions, Monte Carlo methods for exploring posterior distributions and likelihoods, data augmentation, importance sampling and MCMC methods.

**Credit Weight:**

**0.5**

**Academic Department (or campus):** Mathematics & Statistics

**Campus:** University of Guelph

**Semester Offering:** Winter 2016

**Class Schedule and Location:** F2:30-5:20 MCKN521

## Instructor Information

**Instructor Name:** Ed Carter

**Instructor Email:** [ecarter@uoguelph.ca](mailto:ecarter@uoguelph.ca)

**Office location and office hours:** MF 1:30-2:30

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## Course Content

**Specific Learning Outcomes:**

The student will obtain a rigorous understanding of important concepts in classical frequentist, likelihood, and Bayesian inference. The depth of the coverage of the material will notably greater than that in STAT\*4340.

**Lecture Content:**

- 1) Inferential paradigms and foundational concepts.
- 2) Decision theory

- 3) The Likelihood Principle, the MLE, asymptotic properties of the MLE.
- 4) Properties of the expected Fisher information.
- 5) Inference in the multiparameter case.
- 6) Higher-order theory.
- 7) Bayesian inference and computational methods.
- 8) The EM algorithm and the MM principle.

### **Course Assignments and Tests:**

	Date	Worth
Assignments	Every two weeks approx	40%
Mid-term	Feb 26 in class	30%
Project	April 13	30%
Total		100%

### **Course Resources**

#### **Required Texts:**

Tools for Statistical Inference

Methods for the Exploration of Posterior Distributions and Likelihood Functions

Author: **Tanner**, Martin A. Springer-Verlag

### **Course Policies**

#### **Grading Policies**

All assignments will be submitted on time unless prior approval is obtained.

## **University Policies**

### **Academic Accommodation of Religious Obligations**

If you are unable to complete a course requirement due to religious obligations, please let the instructor know within the first two weeks of class. See the academic calendar for more information:

<https://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-accomrelig.shtml>

### **Academic Consideration**

When you find yourself unable to meet an in-course requirement because of illness or compassionate reasons, please advise the course instructor in writing, with your name, id#, and e-mail contact. See the academic calendar for information on regulations and procedures for Academic Consideration:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-ac.shtml>

### **Academic Misconduct**

The University of Guelph is committed to upholding the highest standards of academic integrity and it is the responsibility of all members of the University community, faculty, staff, and students to be aware of what constitutes academic misconduct and to do as much as possible to prevent academic offences from occurring.

University of Guelph students have the responsibility of abiding by the University's policy on academic misconduct regardless of their location of study; faculty, staff and students have the responsibility of supporting an environment that discourages misconduct. Students need to remain aware that instructors have access to and the right to use electronic and other means of detection. Please note: Whether or not a student intended to commit academic misconduct is not relevant for a finding of guilt. Hurried or careless submission of assignments does not excuse students from responsibility for verifying the academic integrity of their work before submitting it. Students who are in any doubt as to whether an action on their part could be construed as an academic offence should consult with a faculty member or faculty advisor.

The Academic Misconduct Policy is detailed in the Undergraduate Calendar:

<http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-amisconduct.shtml>

### **Accessibility**

The University of Guelph is committed to creating a barrier-free environment. Providing services for students is a shared responsibility among students, faculty and administrators. This relationship is based on respect of individual rights, the dignity of the individual and the University community's shared commitment to an open and supportive learning environment.

Students requiring service or accommodation, whether due to an identified, ongoing disability or a short-term disability should contact the Student Accessibilities Services (SAS) as soon as possible.

For more information, contact SAS at 519-824-4120 ext. 56208 or email [csd@uoguelph.ca](mailto:csd@uoguelph.ca) or see the website: <http://www.uoguelph.ca/csd/>

### **Course Evaluation Information**

Please see <http://www.mathstat.uoguelph.ca/files/TeachevaluationformF10.pdf>

### **Drop date**

The last date to drop one-semester courses, without academic penalty, is **Friday, March 11, 2016**. For regulations and procedures for Dropping Courses, see the Academic Calendar: <http://www.uoguelph.ca/registrar/calendars/undergraduate/current/c08/c08-drop.shtml>