SYLLABUS: CSC412/2506 WINTER 2023

1. Instructors.

- Michal Malyska
  Email: michal.malyska@mail.utoronto.ca Make sure to include "CSC412" in the subject
  Office: Online (same zoom link as classes)
  Office Hours: TBD

2. Lectures. This course has two sections. These will be taught as similarly as possible, but are not guaranteed to be identical:

- MWF 12pm-1pm
- MWF 1pm-2pm

3. Course webpages. The course webpage contains all course information, additional readings, assignments, announcements, office hours, etc. You are expected to check the following sites regularly!

- michalmalyska.github.io/csc412/
- q.utoronto.ca
- https://piazza.com/utoronto.ca/winter2023/csc412

4. Lectures and Recordings. This course, including your participation, may be recorded on video and will be available to students in the course for viewing remotely and after each session. Course videos and materials belong to your instructor, the University, and/or other sources depending on the specific facts of each situation and are protected by copyright. In this course, you are permitted to download session videos and materials for your own academic use, but you should not copy, share, or use them for any other purpose without the explicit permission of the instructor. For questions about the recording and use of videos in which you appear, please contact your instructor.

5. Course Evaluation.

- 3 assignments: 40% (weighted equally)
- Midterm exam: 20%
- Final exam: 40%

6. Course Outline. This course covers several commonly used machine learning algorithms and related methods. Topics may include:

1. Introduction
2. Probabilistic Models
3. Decision theory
4. Directed Graphical Models

5. Markov Random Fields
6. Exact inference
7. Message passing
8. Sampling & MCMC
9. Hidden Markov Models
10. Variational inference
11. EM algorithm
12. Bayesian regression
13. Probabilistic PCA
14. Kernel methods
15. Gaussian processes
16. Variational Autoencoders

7. Textbooks. There is no required course textbook. The following materials can be helpful.

- Christopher M. Bishop (2006). Pattern Recognition and Machine Learning
- Ian Goodfellow, Yoshua Bengio and Aaron Courville (2016), Deep Learning
- Kevin Murphy (2012). Machine Learning: A Probabilistic Perspective
- Trevor Hastie, Robert Tibshirani, Jerome Friedman (2009). The Elements of Statistical Learning
- Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani (2017). Introduction to Statistical Learning
- David MacKay (2003). Information Theory, Inference, and Learning Algorithms

8. Assignments. There will be 3 assignments in this course. The assignments will be released on the course webpage. Submission instructions will be provided with each assignment.

8.1. *Collaboration policy on the assignments.* Assignments must be your own individual work. After attempting the problems on an individual basis, you may discuss and work together on the homework assignments with up to two classmates. However, **you must write your own code and write up your own solutions individually and explicitly name any collaborators at the top of the homework.**

9. Exams. There will be a midterm exam at the normal class time during the week of Feb 27th (the week after reading week) Details will be announced in class and on the course webpage. Final exam date is TBD. **Collaboration on the exams is not allowed!** Violation of this policy is grounds for a semester grade of F, in accordance with university regulations.

10. Late policy. in advance of the deadline. Ten percent of the value will be deducted for each late day (up to 3 days, then submission is blocked). No credit will be given for assignments submitted after 3 days.

11. Absence declaration. For 2022-23, the Verification of Illness (or "doctor's note") is not required. Students who are absent from academic participation for any reason (e.g., COVID, cold, flu and other illness or injury, family situation) and who require consideration for missed academic work have been asked to record their absence through the ACORN online absence declaration. The absence declaration is considered sufficient documentation to indicate an absence and no

additional information or documentation should be required when seeking consideration from an instructor. Students should also advise their instructor of their absence. Instructors will not be automatically alerted when a student declares an absence. It is a student's responsibility to let instructors know that they have used the Absence Declaration so that you can discuss any needed consideration, where appropriate.

12. Grading concerns. Any requests to have graded work re-evaluated must be made within one week of the date the grade is released. Re-evaluation may result in a decrease in the grade.

13. Computing. In the assignments, you may need to write your own programs, debug them, and use them to conduct various experiments, plot curves, etc. You may use any programming language, but `Python` is most easily supported by the course staff. For some of the assignments, we will provide you a starter code in `Python` only.

14. Missed Tests.

- If a test is missed for a valid reason, you must submit documentation to the course instructor.
- If the midterm test is missed for a valid reason then the final exam will be worth 60% of your final grade.
- If one of the parts of the midterm test is missed for a valid reason then the weight of that part only will be shifted to the final exam.
- Other reasons for missing a test will require prior approval by your instructor. If you are worried about your circumstances, please reach out to the course staff ahead of time, we might be able to accommodate you.
- If prior approval is not received for non-medical reasons then you will receive a term test grade of zero.

15. Accommodation for Disability Policy. Please send your documented accessibility requests directly to the instructor, at least a week before the due date of each evaluation item. Extensions may be granted, and the duration will be determined based on the letter from the Accessibility Services at the University of Toronto.