COMP 3202/COMP 6915 – Intro to Machine Learning
Course Outline - Winter 2021

Instructor: Dr. Lourdes Peña-Castillo **Office:** ER-6037
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Email: Use Brightspace (online.mun.ca) shell's email. Email will be replied within two working days.

Lectures: TR 12:00 – 12:50 pm and F 1:00 – 1:50 pm (Brightspace online rooms. Synchronous lectures. Lectures will be recorded)

Office Hours: Monday 9:00 – 11:00 am, or by appointment (conducted through Webex).

Questions: Students are encouraged to post course-related questions in Brightspace discussion forum.

Course Description:

This course introduces concepts and algorithms in machine learning for regression and classification tasks. The course gives the student the basic ideas and intuition behind model selection and evaluation, and selected machine learning methods such as random forests, support vector machines, and hidden Markov models.

Pre-requisites:

COMP-3202

COMP 3200; or COMP 2001 or the former COMP 2710, COMP 2002 or the former COMP 2711, and Statistics 2550 ; and Mathematics 2050

COMP-6915

Python programming, a statistics course at the undergraduate level (similar to STAT 2550), and a linear algebra course at the undergraduate level (similar to MATH 2050).

Learning Goals:

1. Understand the basis underlying supervised machine learning methods
2. Understand the algorithms behind certain machine-learning methods
3. Acquire hands-on experience applying supervised machine-learning methods
4. Be able to appropriately evaluate and select a machine-learning model for a specific task

Course Activities:

1. Six assignments
2. Twelve quizzes
3. A final exam
4. **COMP-6915:** A 15-min video tutorial

Textbooks:

- The Elements of Statistical Learning: Data Mining, Inference and Prediction. T. Hastie, R. Tibshirani, J. Friedman. Springer. 2nd Edition. 2009 (http://statweb.stanford.edu/~tibs/ElemStatLearn/)
- An Introduction to Statistical Learning. G. James, D. Witten, T. Hastie and R. Tibshirani. Springer. 2013 (https://statlearning.com/)

- Deep Learning. Ian Goodfellow, Yoshua Bengio, and Aaron Courville. The MIT Press. 2016 (https://www.deeplearningbook.org/)

Evaluation Scheme:

	COMP-3202	COMP-6915
Assignments (6)	36%	30%
Quizzes (12)	40%	40%
Final exam	24%	10%
Video tutorial	N/A	20%

Notes:

1. In the event of university closure on the day of a test, the test will be given in the next class meeting.
2. Assignments will be submitted in electronic format using the Dropbox application in Brightspace. **No late assignments will be accepted.**
3. Course materials, news and communications will be available from the Brightspace system.
4. All grades will be assigned according to the University Calendar (Section 6.9.2 under University Regulations).
5. All written materials delivered must comply with the expectations of Good Writing set out in the University Calendar (Section 6.9.3 under University Regulations).
6. If, for special circumstances (such as medical or bereavement), you miss a deadline for a grade item, notify your professor as soon as possible and no later than 48 hours after the original deadline, providing any necessary related documentation (if documentation is required). Failure to do this might result in a mark of 0% for that grade item. For more information, please see Section 6.7.5 and Section 6.15.6 under University Regulations in the University Calendar or consult the Registrar's Office.
7. From section 6.12 of the University Calendar: "A student is expected to adhere to those principles which constitute proper academic conduct. Academic misconduct cannot be condoned or even appear to be condoned. A student has the responsibility to know which actions, as described under Academic Offences, could be construed as dishonest or improper."**.** Students found guilty of an academic offence may be subject to a number of penalties commensurate with the offence including reprimand, reduction of grade, probation, suspension or expulsion from the University. In addition, see "Avoiding plagiarism – a guide".
8. Memorial University of Newfoundland is committed to supporting inclusive education based on the principles of equity, accessibility and collaboration. Accommodations are provided within the scope of the University Policies for the Accommodations for Students with Disabilities. Students who may need an academic accommodation are asked to initiate the request with the Glenn Roy Blundon Centre at the earliest opportunity (www.mun.ca/blundon).
9. The lectures and displays (and all material) delivered or provided in this course, including any visual or audio recording thereof, are subject to copyright owned by the instructor of the course. It is prohibited to record/copy and distribute by any means, in any format, openly or surreptitiously, in whole or in part, in the absence of express written permission from the instructor any of the lectures or materials provided or published in any form during or from the course.
10. It is the responsibility of the instructor to determine, maintain and enforce the standards of behavior acceptable to preserving an atmosphere appropriate for teaching and learning. Students will be warned if their behavior is evaluated by the instructor as disruptive.
11. Although changes to this document are not intended at this time, any part of this course outline can be subject to change, particularly during the first two weeks of classes. Students should be aware that the latest version of the course outline will be available through the Brightspace shell for the course.

Assignments:

- Assignments will be done in groups of two students.
- Assignment programs have to be implemented in Python 3.
- Assignment programs are required to run in linux command-line.
- For each assignment, data and interface specifications will be provided. If the assignment program does not run according with the specifications, points will be deducted.
- Check Brightspace calendar for due dates

Tentative Course Schedule

Week	Monday	Tuesday	Wed.	Thursday	Friday
1	Jan 11 *Lectures begin*	**Intro to 6915**		**Intro to ML (ESLII Ch2, DL Ch5)**	**Intro to ML**
2	Jan 18	**KNN**		**KNN**	**Model assessment and selection (ESLII Ch7)**
3	Jan 25 *Last day to add*	**Model assessment and selection**		**Model assessment and selection**	**Linear methods for regression (ESLII Ch3)**
4	Feb 1	**Linear methods for classification (ESLII Ch4)**		**Linear methods for classification**	**Linear methods for classification**
5	Feb 8	**Tree-based methods (ESLII Ch9)**		**Tree-based methods**	**Tree-based methods**
6	Feb 15	**Bagging & Boosting (ESLII Ch10)**		**Bagging & Boosting**	**Random Forest**
7	Feb 22 *Winter break begins*				Feb 26 *Winter break ends*
8	March 1	**Random Forest (ESLII Ch15)**		**Support vector machines (ESLII Ch12, IEL Ch9)**	**SVMs**
9	March 8 *Last day to drop*	**SVMs**		**Feedforward networks (DL Ch6)**	**Feedforward networks**
10	March 15	**Feedforward networks**		**Feedforward networks**	**Regularization (DL Ch7)**
11	March 22	**Regularization**		**Convolutional networks (DL Ch9)**	March 26 **CNNs** Saturday March 27 Follow Friday schedule **CNNs**
12	March 29	**Recurrent and recursive nets (DL Ch10)**		**RNNs**	April 2 *Good Friday, no classes*
13	April 5	**Practical Methodology**		**Ethical issues**	April 9 *Lectures end* **Q&A**
14	April 12		April 14 *Final exams begin*		
15	April 19				April 23 *Final exams end*