



Faculty of Science  
Department of Computer Science

**Course Outline (Fall 2019)**  
**CP 8318 – Machine Learning**

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| <b>Instructor</b>           | Neil Bruce<br>Dept. of Computer Science, Ryerson University<br>Office: ENG-265<br>Email: <a href="mailto:bruce@ryerson.ca">bruce@ryerson.ca</a><br>Office Hours: To be discussed in class<br>Web: <a href="http://www.scs.ryerson.ca/~bruce/803/">www.scs.ryerson.ca/~bruce/803/</a>  |
| <b>Prerequisites</b>        | MTH 108 and MTH 207 and CPS 305   |
| <b>Calendar Description</b> | Machine learning is the study of algorithms that learn to perform a task from prior experience. Machine learning has a broad range of applicability, including computer vision, robotics, medical diagnosis, bioinformatics and natural language processing. This course will cover the underlying theory and practical applications of machine learning. |
| <b>Reference Textbooks</b>  | No textbook is required, and course notes / slides will provide the most relevant coverage. Following are some recommended textbooks for additional reference.<br><br>Please also see the course web page for additional resources.   |
| <b>Course Organization</b>  | See the course web page for details on course organization.<br><a href="http://www.scs.ryerson.ca/~bruce/803/">www.scs.ryerson.ca/~bruce/803/</a>   |
| <b>Learning Objectives</b>  | At the end of the course, a successful student will be able to:<br><ol style="list-style-type: none"><li>1. Understand fundamental principles, ideas and techniques in machine learning</li><li>2. Understand appropriate methods for dealing with data and strategies for learning in considering domain specific knowledge</li></ol>                    |

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| <b>Evaluation &amp; Feedback</b>                     | <table border="1" data-bbox="396 317 849 520"> <tr> <td data-bbox="396 317 727 384">Assignments</td> <td data-bbox="727 317 849 384">30 %</td> </tr> <tr> <td data-bbox="396 384 727 451">Term Test</td> <td data-bbox="727 384 849 451">20 %</td> </tr> <tr> <td data-bbox="396 451 727 520">Course Project</td> <td data-bbox="727 451 849 520">50%</td> </tr> </table>  | Assignments | 30 % | Term Test | 20 % | Course Project | 50% |
| Assignments  | 30 %   |             |      |           |      |                |     |
| Term Test  | 20 %   |             |      |           |      |                |     |
| Course Project                                       | 50%  |             |      |           |      |                |     |
| <b>Grading requirements</b>                          | To pass the course you require at least 50% of the total course marks.   |             |      |           |      |                |     |
| <b>Information Technology and electronic devices</b> | Please exercise appropriate use of laptop computers and other electronic devices in the classroom, and refrain from use of cellular phones except in the case of urgent or extenuating circumstances.  |             |      |           |      |                |     |
| <b>Evaluation Guidelines</b>                         | <ul style="list-style-type: none"> <li>● Assignments will be graded according to the rubric provided with each assignment. There will be 2 assignments (15%, 15%) that will involve in depth practical application of theory to problems defined for each assignment. Students will complete all problems assigned for CPS 840 students, and additional problems specific to CP 8318.</li> <li>● The term test will cover the early and core topics of the course, but not advanced topics or those that are contingent on available time.</li> <li>● The course project will involve identifying a problem to address through machine learning, sourcing data through appropriate channels, applying suitable techniques and algorithms from the course, and reporting in detail on results, successes, failures and what understanding was gained about the problem domain. The course project should be done individually or in pairs where justification is provided.</li> </ul>                           |             |      |           |      |                |     |
| <b>Missed Evaluations</b>                            | Students are required to inform their instructors of any situation which arises during the semester which may have an adverse effect upon their academic performance, and must request any considerations and accommodations according to the relevant policies and well in advance. Failure to do so will jeopardize any academic appeals. <ul style="list-style-type: none"> <li>● <i>Medical certificates</i> – If a student misses the deadline for submitting an assignment, or the date of an exam or other evaluation component because of illness, he or she must submit a Ryerson Student Medical Certificate AND an Academic Consideration form within 3 working days of the missed date. Both documents are available at <a href="http://www.ryerson.ca/senate/forms/medical.pdf">www.ryerson.ca/senate/forms/medical.pdf</a>. If you are a full-time or part-time degree student, then you submit your forms to your own program department or school. If you are a certificate or non-</li> </ul> |             |      |           |      |                |     |

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|   | <p>certificate student, then you submit your forms to the staff at the front desk of the Chang School.</p> <ul style="list-style-type: none"> <li>● <i>Religious observance</i> – If a student needs accommodation because of religious observance, he or she must submit a Request for Accommodation of Student Religious, Aboriginal and Spiritual Observance AND an Academic Consideration form within the first 2 weeks of the class or, for a final examination, within 2 weeks of the posting of the examination schedule. If the required absence occurs within the first 2 weeks of classes, or the dates are not known well in advance as they are linked to other conditions, these forms should be submitted with as much lead time as possible in advance of the required absence. Both documents are available at <a href="http://www.ryerson.ca/senate/forms/reobservforminstr.pdf">http://www.ryerson.ca/senate/forms/reobservforminstr.pdf</a>. If you are a full-time or part-time degree student, then you submit the forms to your own program department or school. If you are a certificate or non-certificate student, then you submit the forms to the staff at the front desk of the Chang School.</li> <li>● <i>Students who need academic accommodation support</i> should register with the Academic Accommodation Support office (formerly called the Access Centre). Before the first graded work is due, registered students should inform their instructors through an “Accommodation Form for Professors” that they are registered with Academic Accommodation Support and what accommodations are required.</li> </ul> |
| <p><b>Communication with Students</b></p> | <p>Ryerson’s email policy <a href="http://www.ryerson.ca/content/dam/senate/policies/pol157.pdf">http://www.ryerson.ca/content/dam/senate/policies/pol157.pdf</a> states that only Ryerson e-mail accounts are to be used for communication with students. All students, including continuing education students, have access to Ryerson email through their <a href="http://my.ryerson.ca">my.ryerson.ca</a> site, and this is the official way in which they receive communication. All students are required to register for and maintain this account. <b><i>Emails sent from other accounts may not be answered!</i></b></p>   |
| <p><b>Course Content</b></p>              | <p>See the course webpage for the most up to date details concerning class schedule and announcements.<br/>The course webpage is: <a href="http://www.scs.ryerson.ca/~bruce/840/">www.scs.ryerson.ca/~bruce/840/</a></p>  |
| <p><b>Academic Policies</b></p>           | <p>a. <i>Ryerson Policies of Interest</i><br/>Ryerson Senate Policies - <a href="http://www.ryerson.ca/senate/policies/">http://www.ryerson.ca/senate/policies/</a><br/>Ryerson Academic Integrity - <a href="http://www.ryerson.ca/academicintegrity/">http://www.ryerson.ca/academicintegrity/</a><br/>Policy 46 - Undergraduate Grading, Promotion and Academic Standing<br/>Policy 60 - <u>Student Code of Academic Conduct</u><br/>Policy 61 - <u>Student Code of Non-academic Conduct</u></p>   |

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|                             | <p>Policy 134 - Undergraduate Academic Consideration and Appeals<br/> Policy 135 - Examination Policy<br/> Policy 150 - Accommodation of Student Religious Observance Obligations<br/> Policy 157 - Student Email Accounts for Official University Communication</p> <p>b. <i>Obligations</i> – Students need to inform faculty of any situation arising during the semester which may have an adverse effect upon their academic performance; they must request any necessary considerations (e.g. medical or compassionate), or accommodations [e.g. religious observance, disability (should be registered with the Access Centre), etc.] according to policies and well in advance. Failure to do so will jeopardize any academic appeals.</p> <p>c. <i>Re-grading and Re-calculation</i> – Must be requested within 10 working days of the return of the graded assignment to the class.</p>  |
| <b>Academic Conduct</b>     | <p><a href="http://www.ryerson.ca/academicintegrity/">http://www.ryerson.ca/academicintegrity/</a><br/> In order to create an environment conducive to learning and respectful of others’ rights, phones and pagers must be silenced during lectures, lab sessions and evaluations. Students should refrain from disrupting the lectures by arriving late and/or leaving the classroom before the lecture is finished.</p>   |
| <b>Academic Misconduct</b>  | <p>According to the Ryerson policy 60 (<a href="http://www.ryerson.ca/content/dam/senate/policies/pol60.pdf">http://www.ryerson.ca/content/dam/senate/policies/pol60.pdf</a>), academic misconduct includes, but is not limited to:</p> <ul style="list-style-type: none"> <li>▪ Plagiarism which is the claiming of words, ideas, artistry, drawings or data of another person. This also includes submitting your own work in whole or in part for credit in two or more courses.</li> <li>▪ Cheating</li> <li>▪ Misrepresentation of personal identity or performance</li> <li>▪ Submission of false information</li> <li>▪ Contributing to academic misconduct</li> <li>▪ Damaging, tampering, or interfering with the scholarly environment</li> <li>▪ Unauthorized copying or use of copyrighted materials</li> <li>▪ Violations of departmental policies or professional behavior</li> <li>▪ Violations of specific departmental or course requirements</li> </ul> <p>Committing academic misconduct will trigger academic penalties, including:</p> <ul style="list-style-type: none"> <li>● a course-grade reduction that may be more severe than assigning a grade of “zero” (0) on course work; failing grades, suspension and possibly expulsion from the University. As a Ryerson student, you are responsible for familiarizing yourself with Ryerson conduct policies.</li> </ul> |
| <b>Non-Academic Conduct</b> | <p>Ryerson's Student Code of Non-academic Conduct is described in Senate Policy 61: <a href="http://www.ryerson.ca/content/dam/senate/policies/pol61.pdf">http://www.ryerson.ca/content/dam/senate/policies/pol61.pdf</a><br/> Among many other infractions, the code specifically refers to the following as a violation: “Disruption of Learning and Teaching - Students shall not behave in</p>   |

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|  | disruptive ways that obstruct the learning and teaching environment”.  |
| <b>Diversity and Inclusion Statement</b> | In this course I would like to create a learning environment that supports a diversity of thoughts, perspectives and experiences, and honors your identities (including race, gender, class, sexuality, religion, ability, etc.) For more information about our University’s resources and services on Equity, Diversity, and Inclusion please visit <a href="https://www.ryerson.ca/equity/">https://www.ryerson.ca/equity/</a> |
| <b>Land Acknowledgement</b>              | Toronto is in the 'Dish With One Spoon Territory'. The Dish With One Spoon is a treaty between the Anishinaabe, Mississaugas and Haudenosaunee that bound them to share the territory and protect the land. Subsequent Indigenous Nations and peoples, Europeans and all newcomers have been invited into this treaty in the spirit of peace, friendship and respect.  |