

Course Outline (Spring Term)

EE8204: Neural Networks

Instructor	NAME: Kandasamy Illanko Office: Phone: 416-979-5000 ext. XXXX E-mail: killanko@ryerson.ca Office Hours:	
Calendar Description	A course on the theory, design, and implementation of Neural Networks. The topics covered include feed Forward Neural Networks, Back Propagation Algorithm, and Self-Organizing Feature Maps. Applications include, but is not limited to, NLP, speech and pattern recognition, and big data.	
Prerequisites	Programming experience in any language such as C, Java, Python or Matlab.	
Compulsory Text	Online Text by the Instructor	
Reference Texts	Chapters 6 - 12, <i>Deep Learning</i> , I. Goodfellow, Y. Bengio and A. Courville, MIT Press, 2016. Chapters 1 – 4, 11 and 13, <i>Neural Network Design</i> , M. T. Hagan, H. B. Demuth, M. H. Beale, and O. D. Jesus, 2014. Chapters 3, 4 and 7, <i>Neural Networks for Pattern Recognition</i> , C. M. Bishop, Clarendon Press, Oxford, 1995.	
Course Organization	3 hours of lecture per week for 13 weeks.	
Teaching Assistants	None	
Course Evaluation	Assignments	15%
	Final Exam	50%
	Course Project	35%

	Final Mark	100%
Examinations	Final exam, on the last week, during the lecture period, closed-book, covers the entire syllabus.	

Other Evaluation and/or Information

Course Project: Students are required to design, code, and test an original Neural Network of sufficient complexity that solves a particular problem and submit a report describing the problem, design and the results in the format of an IEEE conference proceedings.

Course Content

Week	Detailed Description	Hours
1	Introduction (Chapter 1)	3
2	Basic Perceptron (Chapter 4)	3
3	Single Layer Neural Networks (Chapter 6)	3
4	Steepest Decent Algorithm (Chapter 5)	3
5	Multi-Layer Neural Networks (Chapter 6)	3
6	Back Propagation Algorithm the Scalar Version (Chapter 6)	3
7	Back Propagation Algorithm the Matrix Version (Chapter 8)	3
8	Regularizing, Validation and Generalization	3
9	Project Issues	3
10	TensorFlow 2.0	3
11	TensorFlow 2.0	3
12	Self-Organizing Feature Maps (Chapter 9)	3
13	Final Exam	3

Note: Schedule of lectures is tentative. There may be some changes in the schedule that will be announced in the class and posted on the course website.

Important Notes

1. All of the required course-specific written reports will be assessed not only on their technical/academic merit, but also on the communication skills exhibited through these reports.
2. All assignment and lab/tutorial reports must have the standard cover page which must be signed by the student(s) prior to submission of the work. Submissions without the cover page **will not** be accepted. The cover page can be found on the departmental web site: [Standard Assignment/Lab Cover Page](#)
3. Should a student miss a mid-term test or equivalent (e.g. studio or presentation), with appropriate documentation, a make-up assessment **may** be scheduled. Alternatively, the weight of the missed work is placed on the final exam, or another single assessment. This may not cause that exam or assessment to be worth more than 70% of the student's final grade. If a student misses a scheduled make-up test or exam, the grade may be distributed over other course assessments even if that makes the grade on the final exam worth more than 70% of the final grade in the course. Make-up assessments cover the same material as the original assessment but need not be of an identical format.

4. Students who miss a final exam for a verifiable reason and who cannot be given a make-up exam prior to the submission of final course grades, must be given a grade of INC (as outlined in the *Grading Promotion and Academic Standing Policy*) and a make-up exam (normally within 2 weeks of the beginning of the next semester) that carries the same weight and measures the same knowledge, must be scheduled.
5. Medical or Compassionate documents for the missing of an exam must be submitted within 3 working days of the exam. Students are responsible for notifying the instructor that they will be missing an exam as soon as possible.
6. **If a student is requesting accommodation due to a religious, aboriginal and/or spiritual 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 TWO WEEKS OF CLASS or, for a final examination, within two weeks of the posting of the examination schedule.** If the required absence occurs within the first two 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 <http://www.ryerson.ca/senate/forms/reobservforminstr.pdf>. Full-time or part-time degree students must submit the forms to their own program department or school.
7. The results of the first test or mid-term exam will be returned to students before the deadline to drop an undergraduate course in good Academic Standing.
8. Students are required to adhere to all relevant University policies including:
 - Undergraduate Grading, Promotion and Academic Standing: <http://www.ryerson.ca/senate/policies/pol46.pdf>
 - Student Code of Academic Conduct: <http://www.ryerson.ca/senate/policies/pol60.pdf>
 - Student Code of Non-Academic Conduct: <http://www.ryerson.ca/senate/policies/pol61.pdf>
 - Undergraduate Academic Consideration and Appeals: <http://www.ryerson.ca/senate/policies/pol134.pdf>
 - Examination Policy: <http://www.ryerson.ca/senate/policies/pol135.pdf>
 - Course Management Policy: <http://www.ryerson.ca/senate/policies/pol145.pdf>
 - Accommodation of Student Religious, Aboriginal and Spiritual Observance: <http://www.ryerson.ca/senate/policies/pol150.pdf>
 - Establishment of Student E-mail Accounts for Official University Communication: <http://www.ryerson.ca/senate/policies/pol157.pdf>
9. Students are required to obtain and maintain a Ryerson e-mail account for timely communications between the instructor and the students.
10. Any changes in the course outline, test dates, marking or evaluation will be discussed in class prior to being implemented.
11. Assignments, projects, reports and other deadline-bound course assessment components handed in past the due date will receive a mark of ZERO. Marking information will be made available at the time when such course assessment components are announced.
12. If you have taken the course previously and are currently looking to get a laboratory exemption, then you must fill out this form: <http://www.ee.ryerson.ca/guides/ECE-LabExemptionForm.pdf>

Approved by: _____
Course Instructor

Date _____

Approved by: _____
Associate Chair or Program Director

Date _____