

**Proposal Form for Non-Credit, Non-Transcript Courses/Workshops**

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| **Administering Department:** |  |
| **Effective Term:** |  |
| **Complete Course Title:** | **Computing Workshop : Intro to Machine Learning** |
| **Subject Code & Course Number:** |  |
| **Course Rationale:** | As machine learning becomes more ubiquitous in our society, responsible citizenship means understanding how these algorithms work and what we can do to control these algorithms. Machine learning is used for a variety of purposes, from adding dog faces to your selfies to controlling what news you see on social media platforms. As these algorithms grow more influential, it’s important that citizens understand what these algorithms do and how they work. This helps everyday people make more informed decisions about their data and be more crtiical of what they hear on and offline. |
| **Delivery Format:**  **(e.g., online, blended, in-class)** | In class. |
| **Location:** |  |
| **Course Fee:** | Around $120 (TBD) |
| **Duration:** | 6 – 8 sessions (TBD) at 3 hours each session (includies a short break). |
| **Anticipated Date & Time (if applicable) of First Offering:** | Summer or fall 2019 |
| **Amenities Included in Fee:** | Printed copies of materials used in class and a certificate upon completion of the workshop. |
| **Target Audience:** | Adults with no background in math or computer science and interested in learning about machine learning. |
| **Pre-requisites if any:** | None. |
| **Course Description:** | This course teaches participants what machine learning is, how algorithms work, how to implement these algorithms using Python, as well as the ethical implications of machine learning and AI.  Computing Workshop uses research based pedagogical methods to increase student engagement and knowledge retention such as: peer instruction, peer oriented guided inquiry learning (POGIL) activities, and pair programming to name a few. This means Computing Workshop uses a *student-centered teaching philosophy* where students work collaboratively to discover new concepts and tackle problem-based learning exercises. Lecturing or other form of teacher-centered pedagogy are kept to a minimum to ensure students are motivated and authentic members of the learning process.  We have run this course before and are running it again in January and February of 2019. To see the syllabus for this workshop along with all the material used in this class, please visit [www.computing-workshop.com/courses.html#machine-learning](http://www.computing-workshop.com/courses.html" \l "machine-learning) |
| **Course Objectives:** | By the end of the workshop, participants will be able to :  - Describe the process of and implement the following machine learning algorithms in Python : K nearest neighbours, decision trees, and feed forward neural networks.  - Articulate the limitations and ethical implications of machine learning algorithms.  - Describe the general process of machine learning (data cleaning, training the algorithm, testing the alogirthm and validation.) |
| **Topics Covered:** | * Unsupervised learning algorithms   + K means   + Density-based spatial clustering of applications with noise (DBSCAN) * Supervised learning algorithms   + K nearest neighbours   + Decision trees   + Neural networks algothrims, specifically :     - Feed forward neural networks     - Convolutional neural networks     - Recurrent neural networks     - Generative adversarial networks * General machine learning process:   + Data cleaning → training and testing the algorithms → validation * Machine learning use and applications, specifically :   + Computer vision   + Natural language analysis and synthesis   + Medical uses * Machine learning limits and dangers, such as :   + Unethical use and social justice issues surrounding machine learning   + What machine learning will likely never be able to do   + Ethics of data privacy and protection * Python fundamentals :   + Using variables, expressions, functions, and data structures   + Importing libraries and loading data   + Understanding and using machine learning libraries, espeically Sci-Kit learn |
| **Instructor/Facilitator:** | Eric Mayhew (McGill B.Ed. Social Studies 2019)  Jacob Errington (McGill B.Sc. Computer Science 2018, M.Sc. Computer Science 2020) |
| **Registration:**  **(e.g., online, paperbase, in person, etc.)** | Online, using the registration form on our website  [www.computing-workshop.com/registration.html](http://www.computing-workshop.com/registration.html) |
| **Contact Information:** | Eric  email : [eric.mayhew@mail.mcgill.ca](mailto:eric.mayhew@mail.mcgill.ca) phone : 438-929-8587  Jacob  email : [jacob.errington@mail.mcgill.ca](mailto:jacob.errington@mail.mcgill.ca) phone : 514-503-3100 |

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|  | ***Department*** | ***Academic Committee*** | ***Dean*** |
| ***Name:*** | ***Dr. Guy Mineau*** |  | ***Dr. Judith Potter*** |
| ***Signature:*** | C:\Users\jhance1\Documents\Guy signature.png |  |  |
| ***Date:*** |  |  |  |