**Machine Learning**

MET CS767

Learn from Anywhere Course Format, Offered Simultaneously On Campus and Remote

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Office hours: by appointment

Class location: CAS, B06B

Capacity of classroom for in person: 14

**Course Description**

Theories and methods for automating and representing knowledge with an emphasis on learning from input/output data. The course covers a wide variety of approaches, including Supervised Learning, Neural Nets and Deep Learning, Reinforcement Learning, Expert Systems, Bayesian Learning, Fuzzy Rules, and Genetic Algorithms. Each student focuses on two of these approaches and creates a term project.

**Prerequisites**

MET CS 521 and either MET CS 622, MET CS 673 or MET CS 682.

MET CS 677 is strongly recommended.

Or, instructor's consent.

**Learning Objectives**

Students will accomplish the following.

(1) Understand the goals and applications of Machine Learning

(2) Apply the principal ML technologies

(3) Implement more than one of these techniques in a significant manner

**Reference Books**

* We'll use parts of "Machine Learning" by Marsland (2nd edition) ISBN-13: 978-1466583283.
* A good book on deep learning is “Fundamentals of Deep Learning” by Buduma (O’Reilly).

**Courseware**

List course website (Blackboard, CourseInfo, or other), as well as any web links that will be necessary for the class

**Fall 2020 COVID-19 Policies**

**Classroom Rotations:** Classrooms on campus have new capacities that follow guidelines issued by state and local health and government authorities related to COVID-19 and physical distancing. Before the beginning of the class, and throughout the semester, I will be reaching out to students who have indicated that they want to attend the classroom in-person. Our classroom hold **14** students, and therefore we will have two rotations of students that come to class on campus alternate weeks. You will be asked to attend remotely on the week that you have rotated out the classroom.

**Compliance:** All students returning to campus will be required, through a digital agreement, to commit to a set of [Health Commitments and Expectations](http://www.bu.edu/dos/policies/lifebook/covid-19-policies-for-students/) including face coverings, symptom attestation, testing, contact tracing, quarantine, and isolation. The agreement makes clear that compliance is a condition of being a member of our on-campus community.

You have a critical role to play in minimizing transmission of COVID-19 within the University community, so the University is requiring that you make your own health and safety commitments. Additionally, if you will be attending this class in person, you will be asked to show your [Healthway](https://www.bu.edu/healthway/) badge on your mobile device to the instructor in the classroom prior to starting class, and wear your face mask over your mouth and nose at all times. If you do not comply with these rules you will be asked to leave the classroom. If you refuse to leave the class, the instructor will inform the class that they will not proceed with instruction until you leave the room. If you still refuse to leave the room, the instructor will dismiss the class and will contact the academic Dean’s office for follow up.

Boston University is committed to offering the best learning environment for you, but to succeed, we need your help. We all must be responsible and respectful. If you do not want to follow these guidelines, you must participate in class remotely, so that you do not put your classmates or others at undue risk. We are counting on all members of our community to be courteous and collegial, whether they are with classmates and colleagues on campus, in the classroom, or engaging with us remotely, as we work together this fall semester.

**Class Policies**

1. **Assignment Completion & Late Work** – all the assignment has to be submitted in person or by email, or on courseware site. No late work will be acceptable.
2. **Academic Conduct Code** – Cheating and plagiarism will not be tolerated in any Metropolitan College course. They will result in no credit for the assignment or examination and may lead to disciplinary actions. Please take the time to review the Student Academic Conduct Code:

<http://www.bu.edu/met/metropolitan_college_people/student/resources/conduct/code.html>.

**Grading Criteria**

The course grade will be based on

* Active class participation (10%)
* Assignments and Quizzes (25%)
* Project proposal, design and implementation (30%)
* Final exam or final project (35%)

Assignments are expected to be submitted by their respective due dates. Late submissions are not accepted.

**Tentative Class Syllabus**

*Lectures, Readings, and Assignments subject to change, and will be announced in class as applicable within a reasonable time frame.*

The course will cover many machine learning subjects including

* Introduction to Machine learning
* Classification algorithms
* Decision trees
* Support Vector Machines
* Neural networks and deep learning
  + Introduction to neural networks
  + The Perceptron
  + The Multilayer Perceptron
  + Neural network training - Back Propagation
  + Convolutional Neural Network - CNN
* Bayesian learning
* Fuzzy rules and fuzzy logic
* Genetic Algorithms