# Syllabus of the course “Machine learning”

## Course Meeting Times

Lectures: 40 hours, 10 sessions, 4 hours / session

## Description

This course provides a broad introduction to the area of Machine Learning. Topics include:

* Supervised learning (parametric/non-parametric algorithms, support vector machines, kernels, neural networks).
* Best practices in machine learning (bias/variance theory; innovation process in machine learning and AI).
* Basics of python programming.
* Basics of deep learning.

The course will also draw from numerous case studies and applications, so that students will also learn how to apply learning algorithms to building smart robots (perception, control), text understanding (web search, anti-spam), computer vision, database mining, and other areas.

## Problem Sets

There will be a total of 4 problem sets. The content of the problem sets will vary from theoretical questions to more applied problems.

Each problem set is graded with 5 scores.

Problem sets (5 grades for each):

1. Basics of python for ML
2. Linear regression
3. Neural Networks
4. Clustering
5. Deep Learning

## Grading

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| --- | --- | --- |
| **Activities** | **Grades** | **Percentage** |
| Problem sets | 20 | 70% |

## Topics

1. Introduction to ML
2. Introduction to python programming
3. Basics of mathemetics for machine learning
4. Basics of machine learning
5. Neural networks
6. Open CV for computer vision in robotics
7. Deep learning with Keras

**Requirements for students**: linear algebra, statistics, basics of programming, linux

## References

1. Mitchell, Tom. Machine Learning. New York, NY: McGraw-Hill, 1997. ISBN: 9780070428072.
2. <https://www.coursera.org/learn/machine-learning>
3. MacKay, David. Information Theory, Inference, and Learning Algorithms. Cambridge, UK: Cambridge University Press, 2003. ISBN: 9780521642989. Available on-line <http://www.inference.phy.cam.ac.uk/mackay/itila/book.html>
4. http://github.com/ulstu/robotics\_ml