

We use cookies on this website. If you continue to access our website, we'll assume that you consent to receiving cookies in accordance with our [Privacy Policy \(http://www.cs.ox.ac.uk/privacy-policy.html\)](http://www.cs.ox.ac.uk/privacy-policy.html). ✕

University of Oxford Department of Computer Science

HOME > OUR STUDENTS > COURSES > MACHINE LEARNING

Machine Learning: 2014-2015

Course materials

Lectures

This course is taught by **Nando de Freitas** (<http://www.cs.ox.ac.uk/people/nando.defreitas/>).

Lecture 1: Introduction [slides \(lecture1.pdf\)](#) [Video \(https://www.youtube.com/watch?v=PlhFWT7vAEw\)](https://www.youtube.com/watch?v=PlhFWT7vAEw)

Lecture 2: Linear prediction [slides \(lecture2.pdf\)](#) [Video \(https://www.youtube.com/watch?v=DHspIG64CVM\)](https://www.youtube.com/watch?v=DHspIG64CVM)

Lecture 3: Maximum likelihood [slides.pdf \(lecture3.pdf\)](#) [Video \(https://www.youtube.com/watch?v=kPrHqQzCkg0\)](https://www.youtube.com/watch?v=kPrHqQzCkg0)

Lectures 4 & 5: Regularizers, basis functions and cross-validation [slides.pdf \(lecture4.pdf\)](#) [Video 1 \(https://www.youtube.com/watch?v=VR0W_PNwLGw\)](https://www.youtube.com/watch?v=VR0W_PNwLGw) [Video 2 \(https://www.youtube.com/watch?v=qz9bKfOqd0Y\)](https://www.youtube.com/watch?v=qz9bKfOqd0Y)

Lecture 6: Optimisation [slides.pdf \(lecture5.pdf\)](#) [Video \(https://www.youtube.com/watch?v=0qUAb94CpOw\)](https://www.youtube.com/watch?v=0qUAb94CpOw)

Lecture 7: Logistic regression [slides.pdf \(lecture6.pdf\)](#) [Video \(https://www.youtube.com/watch?v=FYgsztDxSvE\)](https://www.youtube.com/watch?v=FYgsztDxSvE)

Lecture 8: Back-propagation and layer-wise design of neural nets [slides.pdf \(lecture7.pdf\)](#) [Video \(https://www.youtube.com/watch?v=-YRB0eFxeQA\)](https://www.youtube.com/watch?v=-YRB0eFxeQA)

Lecture 9: Neural networks and deep learning with Torch [slides.pdf \(lecture8.pdf\)](#) [Video \(https://www.youtube.com/watch?v=NUKp0c4xb8w\)](https://www.youtube.com/watch?v=NUKp0c4xb8w)

Lecture 10: Convolutional neural networks [slides.pdf \(lecture9.pdf\)](#) [Video \(https://www.youtube.com/watch?v=bEUX_56Lojc\)](https://www.youtube.com/watch?v=bEUX_56Lojc)

Lecture 11: Max-margin learning and siamese networks [slides.pdf \(lecture10.pdf\)](#) [Video \(https://www.youtube.com/watch?v=jCGpLSKrl2Y\)](https://www.youtube.com/watch?v=jCGpLSKrl2Y)

Lecture 12: Recurrent neural networks and LSTMs [slides.pdf \(lecture11.pdf\)](#) [Video \(https://www.youtube.com/watch?v=56TYLaQN4N8\)](https://www.youtube.com/watch?v=56TYLaQN4N8)

Lecture 13: Hand-writing with recurrent neural networks (Guest speaker: Alex Graves from Google Deepmind)

Lecture 14: Variational autoencoders and image generation (Guest speaker: Karol Gregor from Google Deepmind)

Lecture 15: Reinforcement learning with direct policy search [slides.pdf \(lecture12.pdf\)](#) [Video \(https://www.youtube.com/watch?v=kUiR0RLmGCo\)](https://www.youtube.com/watch?v=kUiR0RLmGCo)

Lecture 16: Reinforcement learning with action-value functions [slides.pdf \(lecture12.pdf\)](#) [Video \(https://www.youtube.com/watch?v=dV80NAIEins\)](https://www.youtube.com/watch?v=dV80NAIEins)

Practicals

Please click on Timetables on the right hand side of this page for time and location of the practicals. The instructors are **Brendan Shillingford** (<https://www.cs.ox.ac.uk/people/brendan.shillingford/>) and Marcin Moczulsky.

Practicals will use **Torch** (<https://github.com/torch/torch7/wiki/Cheatsheet>), a powerful programming framework for deep learning that is very popular at Google and Facebook research.

Practical on week 2: (1) Learning Lua and the tensor library. **pdf** ([practicals/practical1.pdf](#))

Practical on week 3: (2) Online and batch linear regression. **pdf** ([practicals/practical2.pdf](#))

Practical on week 4: (3) Logistic regression and optimization. **pdf** ([practicals/practical3.pdf](#))

Practical on week 5: continued previous practical.

Practical on week 6: (4) Feedforward neural networks, and implementing your own layer. **pdf** ([practicals/practical4.pdf](#))

Practical on week 7: (5) Intro to nngraph for graph-shaped modules. **pdf** ([practicals/practical5.pdf](#))

Practical on week 8: (6) Training a LSTM language model. **pdf** ([practicals/practical6.pdf](#))

See the **Github repository list** (<https://github.com/oxford-cs-ml-2015/>) for the practicals' code and technical instructions.

Classes

Please click on Timetables on the right hand side of this page for time and location of the classes. The exercises appear below and are due Thursdays at 1pm on the specified week.

Class on Week 3: Problem set (class1.pdf). Due 1pm Thursday of Week 2.

Class on Week 5: Problem set (class2.pdf). Due 1pm Thursday of Week 4.

Class on Week 7: Problem set (class3.pdf). Due 1pm Thursday of Week 6.

Class on Week 8: Problem set (class4.pdf). Due 1pm Thursday of Week 7.

[Calendars \(/calendars.html\)](#)
[Internal \(https://intranet.cs.ox.ac.uk/\)](https://intranet.cs.ox.ac.uk/)
[RSS Feeds \(/rssfeeds.html\)](#)
[Sitemap \(/sitemap.html\)](#)
[Privacy & Cookies \(/privacy-policy.html\)](#)
[Accessibility Statement \(/accessibility.html\)](#)





(<https://www.youtube.com/c/CompSciOxford/>)



(<https://twitter.com/CompSciOxford>)



(<https://www.facebook.com/CompSciOxford>)



(<https://www.instagram.com/compscioxford/?hl=en>)

© University of Oxford 2021

[/people/nando.defreitas/machinelearning/index.html](https://people.nando.defreitas/machinelearning/index.html)