

# Differentiate your Objective

VLC =  $\int \int \int$  Vision,  
Learning & Control

## COMP6248 Differentiable Programming (and some Deep Learning)

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# Remaining lectures

- The following topics will be covered as full 45-minute video lectures:
  - Embeddings
  - Auto-encoders, unsupervised learning and self-supervision
  - Differentiable relaxations and reparameterisations
  - Generative Models
- Some assorted topics will also be covered in shorter videos.
- You'll be able to ask questions via Teams and Slack. We'll also experiment with a live Q&A session using Blackboard Collaborate.
- All the video content is on Blackboard (but perhaps more usefully linked directly from the module page).

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COMP6248 Deep Learning

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There will be two lectures each week. The lecture slots are on predominantly on Mondays at 9 and Fridays at 5 (sorry! I have no control over this), although a few of the Friday slots have been shuffled to Wednesdays. The current working timetable/plan is below, and illustrates the topics I intend to cover, but this will evolve as the course progresses. Many of the lectures are coupled with assigned reading materials that you should read before the lecture takes place. This will broaden your understanding of the topic whilst giving you the skills required to read and understand the key points from recent research literature. The lectures are broadly broken into three groups: fundamentals (weeks 1-4), architectures (weeks 5-8), and advanced topics (weeks 9-12). The table below has been updated with links to lecture videos and two of the planned lectures removed as a result of COVID-19.

Week	Date	Location	Topic	Handouts	Reading Material	Lecture Video
1	27-Jan	Avenue L/T A	Intro and background	<a href="#">intro-handouts.pdf</a>		<a href="#">link</a>
	31-Jan	67/1037	Review of fundamentals	<a href="#">mlreview-handouts.pdf</a>	CH 3 of Michael Nielsen's Book	<a href="#">link</a>
2	03-Feb	Avenue L/T A	The Power of Differentiation	<a href="#">differentiate-handouts.pdf</a>		<a href="#">link</a>
	07-Feb	67/1037	Perceptrons, MLPs and Backpropagation	<a href="#">backprop-handouts.pdf</a>	Learning representations by back-propagating errors	<a href="#">link</a>
3	10-Feb	Avenue L/T A	Automatic Differentiation	<a href="#">autograd-handouts.pdf</a>	Automatic differentiation in PyTorch	<a href="#">link</a>
	12-Feb	SUSU Cinema	Optimisation	<a href="#">optimisation-handouts.pdf</a>	Adam: A Method for Stochastic Optimization	<a href="#">link</a>
4	17-Feb	Avenue L/T A	Deeper Networks: Universal approximation, overfitting and regularisation	<a href="#">deepnetworks-handouts.pdf</a>	Dropout: A Simple Way to Prevent Neural Networks from Overfitting	<a href="#">link</a>
	28-Feb	SUSU Cinema	A Biological Perspective	<a href="#">biological-inspiration-handouts.pdf</a>		<a href="#">link</a>
5	24-Feb	Avenue L/T A	Guest Lecture - Ethan Harris - Visualising Neural Networks	<a href="#">visualisation-handouts.pdf</a>		<a href="#">link</a>
	19-Feb	67/1037	Convolutional Networks	<a href="#">Convolution-handouts.pdf</a>	handwritten digit recognition with a back-propagation network	<a href="#">link</a>
6	02-Mar	Avenue L/T A	Networks Architectures for image classification	<a href="#">Architectures-handouts.pdf</a>	ImageNet Classification with Deep Convolutional Neural Networks, Striving for Simplicity: The All Convolutional Net, Very Deep Convolutional Networks for Large-Scale Image Recognition, Going Deeper with Convolutions, Deep Residual Learning for Image Recognition	<a href="#">link</a>
	06-Mar	67/1037	Networks Architectures for image classification (II)	as above		<a href="#">link</a>
7	09-Mar	Avenue L/T A	Recurrent Neural Networks	<a href="#">rnn-handout.pdf</a>	The Unreasonable Effectiveness of Recurrent Neural Networks	<a href="#">link</a>
12				<a href="#">lstm-</a>		

## Remaining labs

- Labs will run as before starting on the Wednesday 29th April for three weeks.
- Demonstrators will be available in Teams and Slack during the normal lab hours (9-11 AM BST).
- You can use colab or log onto lab machines remotely if you want to.
- New handin date for lab exercises: 20th May.

## Online quiz 2

- New (proposed) date: Thursday 14th May.
- As before you'll have 1 hour to complete it.
- I'll keep it open to start for 24 hours this time.

- Continue as before...
- Ask the demonstrators or me questions during the online lab sessions.
- The deadline will be extended to the 16:00 on the 29th May.