



## Prescription

This course covers a range of topics in machine learning, with a focus on inference and uncertainty. Topics include optimization, Bayesian probability theory, learning from rewards, unsupervised learning, Belief networks and particle filters.

## Course learning objectives

Students who pass this course will be able to:

1. Explain advanced concepts of neural networks and deep learning.
2. Use and implement deep learning techniques to solve real-world problems such as classification and the generation of realistic images.
3. Read, interpret, and explain current papers on deep learning in the research literature.

## Course content

In 2020, the course has a narrower focus:

The course addresses the fundamentals of neural network based deep learning. It covers the commonly used deep learning architectures such as fully connected networks, resnets, variational autoencoders, and generative adversarial networks. It discusses functional blocks such as convolutional nets, recurrent neural nets such as LSTMs, and the common objective functions and regularization procedures. Examples will discuss applications such as object classification, classification of sequential text, and the generation of realistic human faces.

## Withdrawal from Course

Withdrawal dates and process:

<https://www.wgtn.ac.nz/students/study/course-additions-withdrawals>

## Lecturers

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**Bastiaan Kleijn (Coordinator)**

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417 Alan MacDiarmid Building, Kelburn

## Teaching Format

This course will be offered in-person and online. For students in Wellington, there will be a combination of in-person components (lectures and office hours) and web/internet based resources. It will also be

possible to take the course entirely online for those who cannot attend on campus, with lectures accessible by zoom and also recorded, and office-hours via email or zoom.

## Student feedback

Student feedback on University courses may be found at:  
[www.cad.vuw.ac.nz/feedback/feedback\\_display.php](http://www.cad.vuw.ac.nz/feedback/feedback_display.php)

## Dates (trimester, teaching & break dates)

- Teaching: 13 July 2020 - 18 October 2020
- Break: 17 August 2020 - 30 August 2020
- Exam period: 19 October 2020 - 25 October 2020

## Class Times and Room Numbers

### 13 July 2020 - 16 August 2020

- **Monday** 13:10 - 14:00 – 106, Alan MacDiarmid Building, Kelburn
- **Tuesday** 13:10 - 14:00 – 102, Alan MacDiarmid Building, Kelburn
- **Thursday** 13:10 - 14:00 – LT105, Alan MacDiarmid Building, Kelburn

### 31 August 2020 - 18 October 2020

- **Monday** 13:10 - 14:00 – 106, Alan MacDiarmid Building, Kelburn
- **Tuesday** 13:10 - 14:00 – 102, Alan MacDiarmid Building, Kelburn
- **Thursday** 13:10 - 14:00 – LT105, Alan MacDiarmid Building, Kelburn

## Set Texts and Recommended Readings

### Required

There are no required texts for this offering.

## Mandatory Course Requirements

There are no mandatory course requirements for this course.

*If you believe that exceptional circumstances may prevent you from meeting the mandatory course requirements, contact the Course Coordinator for advice as soon as possible.*

## Assessment

This course will be assessed through assignments, a project, and a test.

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Assessment Item	Due Date or Test Date	CLO(s)	Percentage
Four assignments (6 hours each)	Weeks 3, 5, 7, 9	CLO: 2	40%
Project (20 hours)	End of Assessment week	CLO: 1,2,3	40%
Test	Week 12	CLO: 1,2	20%

## Penalties

it is important to get the assignments in on time if possible, and so late hand-in will be penalized at 20% per day (unless a prior arrangement has been made with the lecturer).

## Extensions

Individual extensions will only be granted where there are special personal circumstances, and should be negotiated with the course coordinator before the deadline whenever possible. Documentation (eg, medical certificate) may be required.

## Submission & Return

All work should be submitted through the ECS submission system, accessible through the course web pages. Marks and comments will be returned through the ECS marking system, also available through the course web pages.

## Workload

In order to maintain satisfactory progress in COMP 421, you should plan to spend an average of 10-11 hours per week on this paper. A plausible and approximate breakdown for these hours would be:

- Lectures: 3
- Readings and reviewing the lecture material: 3
- Assignments or project : 4

## Teaching Plan

See [https://ecs.wgtn.ac.nz/Courses/COMP421\\_2020T2/LectureSchedule](https://ecs.wgtn.ac.nz/Courses/COMP421_2020T2/LectureSchedule)

## Communication of Additional Information

All online material for this course can be accessed at [https://ecs.wgtn.ac.nz/Courses/COMP421\\_2020T2/](https://ecs.wgtn.ac.nz/Courses/COMP421_2020T2/)

## Links to General Course Information

- Academic Integrity and Plagiarism: <https://www.wgtn.ac.nz/students/study/exams/integrity-plagiarism>
- Academic Progress: <https://www.wgtn.ac.nz/students/study/progress/academic-progress> (including restrictions and non-engagement)
- Dates and deadlines: <https://www.wgtn.ac.nz/students/study/dates>
- Grades: <https://www.wgtn.ac.nz/students/study/progress/grades>
- Special passes: Refer to the Assessment Handbook, at

<https://www.wgtn.ac.nz/documents/policy/staff-policy/assessment-handbook.pdf>

- Statutes and policies, e.g. Student Conduct Statute: <https://www.wgtn.ac.nz/about/governance/strategy>
- Student support: <https://www.wgtn.ac.nz/students/support>
- Students with disabilities: [https://www.wgtn.ac.nz/st\\_services/disability/](https://www.wgtn.ac.nz/st_services/disability/)
- Student Charter: <https://www.wgtn.ac.nz/learning-teaching/learning-partnerships/student-charter>
- Terms and Conditions: <https://www.wgtn.ac.nz/study/apply-enrol/terms-conditions/student-contract>
- Turnitin: <http://www.cad.vuw.ac.nz/wiki/index.php/Turnitin>
- University structure: <https://www.wgtn.ac.nz/about/governance/structure>
- VUWSA: <http://www.vuwsa.org.nz>

**Offering CRN: [986](#)**

**Points:** 15

**Prerequisites:** COMP 307 or COMP 420; one further 300-level COMP, ECEN, NWEN or SWEN course

**Duration:** 13 July 2020 - 25 October 2020

**Starts:** Trimester 2

**Campus:** Kelburn