



## Prescription

This course teaches underlying algorithms and techniques of machine learning, with an emphasis on techniques that use probability and graphical models.

## Course learning objectives

Students who pass this course will be able to:

1. Explain fundamental concepts underlying inference under uncertainty.
2. Use appropriate inference techniques to solve machine learning problems that involve reasoning from data under uncertainty.
3. Use probabilistic concepts to construct predictive models of realistic data.
4. Read and evaluate recent papers in the machine learning literature, in terms of the fundamental concepts of inference under uncertainty.

## Required Academic Background

This course involves frequent use of mathematics and mathematical notation, and so confidence in basic mathematics (especially linear algebra and probability) is essential. Advanced probability theory is not required.

## Withdrawal from Course

Withdrawal dates and process:

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

## Lecturers

**Marcus Frean (Coordinator)**

Marcus.Frean@vuw.ac.nz 04 4635672

337 Cotton, Kelburn

## Teaching Format

This course will be taught face-to-face using lectures. Some lecture slots will be more in the form of a tutorial, with discussion and working through examples.

## Dates (trimester, teaching & break dates)

- Teaching: 02 March 2020 - 07 June 2020
- Break: 13 April 2020 - 27 April 2020
- Study period: 08 June 2020 - 11 June 2020
- Exam period: 12 June 2020 - 27 June 2020

## Class Times and Room Numbers

### 02 March 2020 - 22 March 2020

- **Monday** 12:00 - 12:50 – 119, Cotton, Kelburn
- **Wednesday** 12:00 - 12:50 – 119, Cotton, Kelburn

### 27 April 2020 - 07 June 2020

- **Monday** 12:00 - 12:50 – 119, Cotton, Kelburn
- **Wednesday** 12:00 - 12:50 – 119, Cotton, Kelburn

## Other Classes

As well as the 2 lectures, there will be a third session for review and discussion each week, at 9am each Friday. It is equally important to get to this session as to attend the lectures.

## Set Texts and Recommended Readings

### Required

The textbook can be purchased in hardcopy, or freely read online via the university library. Murphy's book is 1000 pages long and has a lot of technical detail that is beyond the scope for this course: instead, we will be picking and choosing specific sections to study in detail.

- Textbook: "*Machine Learning: a probabilistic perspective*", by Kevin P. Murphy (MIT Press).

## Mandatory Course Requirements

In addition to achieving an overall pass mark of at least 50%, students must:

- Obtain a **D** grade or better in the final examination.

*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

Assessment Item	Due Date or Test Date	CLO(s)	Percentage
10 short exercises (1% each)	hand in weekly at the 3rd lecture slot.	CLO: 1,2,3	10%
Assignment 1 (20 hours)	end of week 4	CLO: 2	15%
Assignment 2 (20 hours)	midway through the mid-term break	CLO: 2,3	20%
Assignment 3 (20 hours)	end of week 10	CLO: 2,3,4	15%
Final examination (3 hours duration)	as per VUW exam timetable	CLO: 1,2,3,4	40%

## Penalties

Unless otherwise agreed with the lecturer, exercises and assignments will be penalised by 20% for each day late (including Saturdays and Sundays).

## Extensions

Individual extensions will only be granted in exceptional 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 worth over 2% 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.

The other, small, exercises need to be done on paper (hand-written is fine provided it is legible) and physically handed in at the 3rd session of the week.

## Workload

The student workload for this course is 150 hours.

## Teaching Plan

A detailed plan of lectures will be available (once the course starts) on [https://ecs.wgtn.ac.nz/Courses/COMP471\\_2020T1/](https://ecs.wgtn.ac.nz/Courses/COMP471_2020T1/)

## Communication of Additional Information

All online material for this course can be accessed at [https://ecs.wgtn.ac.nz/Courses/COMP471\\_2020T1/](https://ecs.wgtn.ac.nz/Courses/COMP471_2020T1/)

## 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:** [26217](#)

**Points:** 15

**Prerequisites:** One of (COMP 307, 309); MATH 177 or STAT 292 or STAT 293, or approved background in Mathematics or Statistics.

**Duration:** 02 March 2020 - 28 June 2020

**Starts:** Trimester 1

**Campus:** Kelburn