



## Prescription

The course provides students with an introduction to the physical layer of communication systems. It begins with basics of analog communications (AM, FM). Digital communications topics include intersymbol interference and Nyquist pulse shaping for bandlimited channels, matched filter receivers for additive noise channels and their error rate performance. Also covered are fundamentals of wireless fading channels and diversity receivers, followed by a brief overview of equalisation and OFDM.

## Course learning objectives

Students who pass this course will be able to:

1. describe various analogue and digital modulation techniques, including their relative merits (BE graduate attribute 3(a)).
2. design receivers to mitigate the effects of noise and interference of bandlimited channels (BE graduate attributes 3(a),3(c)).
3. describe wireless propagation channel models in different operating environments (BE graduate attributes 3(a),3(c)).
4. design Monte Carlo simulations to evaluate the performance of wireless systems (BE graduate attributes 3(d),3(f)).

## Course content

2022: The course is primarily offered in-person, and there are components such as tests, labs, tutorials, and marking sessions which require in-person attendance. There will be remote alternatives for all the components of the course, but these are only available to students studying from outside the Wellington region. The remote option for tests will use a Zoom-based system for online supervision of the tests.

Students taking this course remotely must have access to a computer with camera and microphone and a reliable high speed internet connection that will support real-time video plus audio connections and screen sharing. Students must be able to use Zoom; other communication applications may also be used. A mobile phone connection only is not considered sufficient. The computer must be adequate to support the programming required by the course: almost any modern windows, macintosh, or unix laptop or desktop computer will be sufficient, but an Android or IOS tablet will not.

## Withdrawal from Course

Withdrawal dates and process:

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

## Lecturers

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# Dr Pawel Dmochowski (Coordinator)

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## Teaching Format

This course will be taught using face-to-face lectures and tutorials. The latter will be primarily used to work through example problems. The labs/projects will feature programming exercises using Matlab.

## 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: 28 February 2022 - 03 June 2022
- Break: 11 April 2022 - 24 April 2022
- Study period: 06 June 2022 - 09 June 2022
- Exam period: 10 June 2022 - 25 June 2022

## Class Times and Room Numbers

### 28 February 2022 - 10 April 2022

- **Monday** 16:10 - 17:00 – 201, Easterfield, Kelburn
- **Wednesday** 16:10 - 17:00 – 201, Easterfield, Kelburn
- **Friday** 16:10 - 17:00 – 201, Easterfield, Kelburn

### 25 April 2022 - 05 June 2022

- **Monday** 16:10 - 17:00 – 201, Easterfield, Kelburn
- **Wednesday** 16:10 - 17:00 – 201, Easterfield, Kelburn
- **Friday** 16:10 - 17:00 – 201, Easterfield, Kelburn

## Set Texts and Recommended Readings

### Required

There are no required texts for this offering.

### Recommended

There are a large number of textbooks covering the principles of communications systems. Examples include

- Proakis and Salehi, *Fundamentals of Communication Systems*, 2ed, 2014, Pearson (International Edition or otherwise)
- Haykin and Moher, *Introduction to analogue and digital communications*, 2ed, 2007, Wiley
- Ziemer and Tranter, *Principles of Communications - Systems Modulation and Noise*, 6ed, 2009, Wiley
- Couch, *Digital and Analog Communication Systems*, 7ed, 2006, Prentice Hall

- Rappaport, *Wireless Communications, Principles & Practice*, 1ed, 1996, Prentice Hall
- Lathi and Ding, *Modern Digital and Analog Communication Systems*, 4ed, 2010, Oxford

## 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

Assessment Item	Due Date or Test Date	CLO(s)	Percentage
1 Lab (approx. 10 hours)	Week 7	CLO: 2,4	10%
1 Project (approx. 20 hours)	Week 11	CLO: 3,4	20%
Test (2 hrs)	Week 6	CLO: 1,2,3	35%
Test (2 hrs)	Week 12	CLO: 1,2,3,4	35%

## Penalties

Work submitted late will incur a 10% penalty per late day or part thereof. Students expecting to submit work late should use the extension system that is part of the submission system.

## Extensions

Extension procedures for EEEN310 will use with the normal Faculty extension process. You need not contact the course lecturers directly for most assignment extensions, but simply follow the procedures within the submission system. If you require extensions beyond that handled automatically then you should contact staff.

## Submission & Return

Submission of assignments and project reports will be through the ECS submission system.

## Workload

The student workload for the course is 150 hours.

## Teaching Plan

See: [https://ecs.wgtn.ac.nz/Courses/EEEN310\\_2022T1/LectureSchedule](https://ecs.wgtn.ac.nz/Courses/EEEN310_2022T1/LectureSchedule)

## Communication of Additional Information

The ECS course wiki ([https://ecs.wgtn.ac.nz/Courses/EEEN310\\_2022T1/](https://ecs.wgtn.ac.nz/Courses/EEEN310_2022T1/)) will be the main source of information for the course. Some information, notably video of the lectures and course feedback forms will be available on the Blackboard site.

## 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-enroll/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:** [34001](#)

**Points:** 15

**Prerequisites:** EEEN 220 (or ECEN 220);

**Restrictions:** ECEN 310

**Duration:** 28 February 2022 - 26 June 2022

**Starts:** Trimester 1

**Campus:** Kelburn