



Prescription

This course provides insights into technologies that convert renewable energy generation into useful fuels or power in the economy and society. It will include bioenergy conversion processes, such as gasification, pyrolysis and torrefaction; chemical storage (solid-state and liquid batteries); thermal storage; and pumped and mechanical storage. It examines the underlying physics and chemistry for each technology platform, with related practical experiments in the laboratory. The engineering approaches to identify and design efficiency improvements for such systems are established.

Course learning objectives

Students who pass this course should be able to:

1. Design advanced, integrated renewable energy storage solutions for given problems.
2. Analyse the sustainability and efficiencies of the storage technology systems.
3. Critically review energy storage technologies to identify efficiency gains that can be achieved.
4. Design and demonstrate an efficiency improvement to energy storage.

Course content

This course is offered in-person and online - for lectures, laboratories and tutorials. The tests will be undertaken online via Blackboard.

Students taking this course remotely from outside the Wellington region 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 practical work 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

Prof Alan Brent (Coordinator)

alan.brent@vuw.ac.nz 04 463 5960

AM 413 Alan Macdiarmid Building, Gate 7, Kelburn Parade, Kelburn

Dr Jim Hinkley

jim.hinkley@vuw.ac.nz 04 463 5515

AM 227 Alan Macdiarmid Building, Gate 7, Kelburn Parade, Kelburn

Teaching Format

Weekly lectures, tutorials, laboratory sessions, and individual assignments. Practical work will involve the analysis of different storage systems. Project work will entail the technical design and demonstration of efficiency improvements, with the aim of having a competition between the students in a cohort.

Student feedback

Student feedback on University courses may be found at: www.cad.vuw.ac.nz/feedback/feedback_display.php

Dates (trimester, teaching & break dates)

- Teaching: 11 July 2022 - 14 October 2022
- Break: 22 August 2022 - 04 September 2022
- Study period: 17 October 2022 - 20 October 2022
- Exam period: 21 October 2022 - 12 November 2022

Class Times and Room Numbers

11 July 2022 - 21 August 2022

- **Monday** 10:00 - 10:50 – 407, Alan MacDiarmid Building, Kelburn
- **Wednesday** 10:00 - 10:50 – 407, Alan MacDiarmid Building, Kelburn
- **Friday** 10:00 - 10:50 – 407, Alan MacDiarmid Building, Kelburn

05 September 2022 - 16 October 2022

- **Monday** 10:00 - 10:50 – 407, Alan MacDiarmid Building, Kelburn
- **Wednesday** 10:00 - 10:50 – 407, Alan MacDiarmid Building, Kelburn
- **Friday** 10:00 - 10:50 – 407, Alan MacDiarmid Building, Kelburn

Set Texts and Recommended Readings

Required

There are no required texts for this offering.

Mandatory Course Requirements

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

- Achieve a grade of at least 40% for the tests and assignments.

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

The assessments will involve laboratories and tutorials, two individual assignments and two online tests.

Assessment Item	Due Date or Test Date	CLO(s)	Percentage
Efficiency analysis assignment with a 1000-word report (20 hours total)	TBC	CLO: 1,2	25%
Laboratory/tutorial exercises with one-page reports (12 hours)	TBC	CLO: 3	10%
Design and demonstration project, with a 1000-word report (20 hours)	TBC	CLO: 3,4	25%
Two tests (2 hours each)	TBC	CLO: 1,2,3	40%

Penalties

Late submissions will be subject to a penalty of 10% per day for 4 days. No work will be accepted after this unless previously arranged with the Course Coordinator.

Extensions

Individual extensions will only be granted in exceptional personal circumstances, and requests should be made to the Course Coordinator before the assessment deadline whenever possible. Documentation (e.g. a medical certificate) may be required.

Submission & Return

Assignments are to be submitted via Blackboard, where feedback will be provided.

Workload

The student workload for this course is 150 hours.

Teaching Plan

The teaching plan will be made available on commencement of the course via Blackboard.

Communication of Additional Information

The main means of communication outside of lectures will be via Blackboard.

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/
- 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: [34008](#)

Points: 15

Prerequisites: EEEN 203, 204

Duration: 11 July 2022 - 13 November 2022

Starts: Trimester 2

Campus: Kelburn