



MECH 447 – Cryogenic Engineering

Term – SUMMER 2015 (201505)

Instructor

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Office Hours

Days: M, TH
Time: 13:00-14:20
Location: ECS 124

Course Objectives

Develop a broad understanding of energy system history, behavior, and anthropogenic impacts. Assess energy conversion systems using thermoeconomics to determine cost, value, and performance.

Learning Outcomes

- Create basic models to predict future atmospheric CO₂ levels
- Understand resource classifications and how and why reserves change over time
- Define efficiency metrics for components and processes
- Identify process changes that may increase efficiency
- Determine levelized costs of energy conversion devices and calculate screening curves
- Explain how the value of an energy conversion technology is linked to jurisdiction

Syllabus

1. Energy System Architecture: material properties, thermal design, cryogen storage systems.
2. Exergy and Economics: refrigeration process, liquefier cycles, yield, efficiency, component impacts.
3. Electrical Systems: Regenerator theory, closed cycle coolers, magnetocalorics, AMR cycles.

Required Text

Title: N/A
Author:
Publisher:
Year:

Optional Text

Title: Sustainable Energy
Author: J. Tester, et al.
Publisher: MIT Press
Year: 2012

Assessment:

Assignments:	25 %
Labs	0%
Quiz 1	30%
Quiz 2	30%
Quiz 3	15%

Due Dates: See detailed schedule for dates.

Date:

Date: See detailed schedule for dates.

Date:

Note:

The final grade obtained from the above marking scheme for the purpose of GPA calculation will be based on the percentage-to-grade point conversion table as listed in the current Undergraduate Calendar.

Assignment of E grade and supplemental examination for this course will be at the discretion of the Course Instructor. The rules for supplemental examinations can be found in the current Undergraduate Calendar.

Note to Students:

Students who have issues with the conduct of the course should discuss them with the instructor first. If these discussions do not resolve the issue, then students should feel free to contact the Chair of the Department by email or the Chair's Secretary to set up an appointment.

Accommodation of Religious Observance

See entry in current Undergraduate Calendar

Policy on Inclusivity and Diversity

See entry in current Undergraduate Calendar

Standards of Professional Behaviour

You are advised to read the Faculty of Engineering document Standards for Professional Behaviour in current Undergraduate Calendar, which contains important information regarding conduct in courses, labs, and in the general use of facilities.

Cheating, plagiarism and other forms of academic fraud are taken very seriously by both the University and the Department. You should consult entry in current Undergraduate Calendar for the UVic policy on academic integrity.

Course Lecture Notes

Unless otherwise noted, all course materials supplied to students in this course have been prepared by the instructor and are intended for use in this course only. These materials are NOT to be re-circulated digitally, whether by email or by uploading or copying to websites, or to others not enrolled in this course. Violation of this policy may in some cases constitute a breach of academic integrity as defined in the UVic Calendar.