



### MECH 445 – Cryogenic Engineering

Term – SUMMER 2015 (201505)

#### Instructor

Dr. Andrew Rowe  
Phone: 250-721-8920  
E-mail: arowe@uvic.ca

#### Office Hours

Days: M, TH  
Time: 14:30-15:50  
Location: ECS 116

#### Course Objectives

Develop analytic tools for design of low temperature systems, processes, gas liquefaction and storage

#### Learning Outcomes

- Predict variations in material properties at low temperature
- Propose designs for liquid cryogen storage systems (Dewars)
- Determine liquefier yield and efficiency for a given process
- Design regenerators for high effectiveness
- Describe working principles of magnetocaloric systems

#### Syllabus

1. Low Temperature Physics: material properties, thermal design, cryogen storage systems.
2. Gas Liquefaction: refrigeration process, liquefier cycles, yield, efficiency, component impacts.
3. Regenerative Cycles: Regenerator theory, closed cycle coolers, magnetocalorics, AMR cycles.

#### Required Text

Title: N/A  
Author:  
Publisher:  
Year:

#### Optional Text

Title: Cryogenic Systems  
Author: R. F. Barron  
Publisher: Oxford University Press  
Year: 1985

#### 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.