



SAINT LOUIS UNIVERSITY
MADRID

ESCI 2300 M01: Thermodynamics
Spring 2018

Class Days and Time: TR, 16:00-17:15

Classroom: SIH-C

Prerequisite(s): Prior or concurrent enrolment in MATH-2530

Credit(s): 3

Instructor: Hector Barrio

Instructor's Email: Hector.barrio@slu.edu

Instructor's Campus Phone: 680301847

Office: PAH Science Faculty Office (PAH 2nd Floor, to the right, next to Dr. Gasmi's office). If I am not there look for me in the basement (physics lab).

Office Hours: M 18:00-19:00, Th 17:30-18:30

Course Description: Thermodynamics is the science of energy, from greek *therme* (heat) and *dynamis* (power) reflecting on the first efforts to convert heat into mechanical power. This science includes all aspects of energy transformation as mechanical power generation, refrigeration, and matter transformations. The most basic tenant of this science is the fundamental law of conservation of energy: energy cannot be created nor destroyed.

Course Goals and Student Learning Outcomes: By the end of this course, you will be able to:

- Understand the thermodynamics implication and thermodynamics explanation for the states of matter and phase changes.
- Understand and apply basic energy conservation equations for kinetic, potential and flow energies.
- Understand the concepts of enthalpy, entropy and the basic laws of thermodynamics.
- Understand and solve thermodynamic cycle problems specially the Carnot ideal cycle.
- Be able to design cost-effective power systems.

Saint Louis University - Madrid Campus is committed to excellent and innovative educational practices. In order to maintain quality academic offerings and to conform to relevant accreditation requirements, the Campus regularly assesses its teaching, services, and programs for evidence of student learning outcomes achievement. For this purpose anonymized representative examples of student work from all courses and programs is kept on file, such as assignments, papers, exams, portfolios, and results from student surveys, focus groups, and reflective exercises. *Thus, copies of student work for this course, including written assignments, in-class exercises, and exams may be kept on file for institutional research, assessment and accreditation purposes.* If students prefer that Saint Louis University - Madrid Campus does not keep their work on file, they need to communicate their decision in writing to the professor.

Required Texts and Materials: Recommended Text: Thermodynamics: An Engineering Approach by Yunus A. Çengel and Michael A. Booles. Editions 6th, and above are valid. All materials will be provided in class, additional reading assignments from the textbook will be given.

Attendance Policy: It is mandatory to attend all classes and be on time unless a reasonable excuse is given.

Course Requirements and Grading System: Evaluation methods and their contribution towards the student's final grade are:

Weekly Homework 10%
Final Project 15%
Midterm Exam 15% + 5% if grade greater than second midterm grade
Second Midterm 15%+ 5% if grade greater than first midterm grade
Final Exam 30%
Class Attendance and Participation 10%

This methods and their relative contribution to the grade may vary.

Participation in the class discussions is highly encouraged, positive additions that helps understand the topic and/or arising alternative views will be welcome. Engineering is partly based in accumulation of knowledge and the only way for this to happen is sharing your thoughts with others.

There will be one midterm exam and one final exam covering the full content of the course. The letter grading scale will be the following:

A	90-100%
A-	87-89%
B+	84-86%
B	80-83%
B-	77-79%
C+	74-76%
C	70-73%
C-	66-69%
D	60-65%
F	< 60%

*Note that late submissions will be penalized with an automatic 15% grade reduction. Minor variations to grading system may be introduced

E-mail: Campus and course announcements will often be handled by e-mail. Students should check their "@slu.edu" e-mail regularly.

University Statement on Academic Integrity: Academic integrity is honest, truthful and responsible conduct in all academic endeavors. The mission of Saint Louis University is "the pursuit of truth for the greater glory of God and for the service of humanity." Accordingly, all acts of falsehood demean and compromise the corporate endeavors of teaching, research, health care and community service via which SLU embodies its mission. The University strives to prepare students for lives of personal and professional integrity, and therefore regards all breaches of academic integrity as matters of serious concern.

The governing University-level Academic Integrity Policy can be accessed on the Provost's Office [website](#). Additionally, SLU-Madrid has posted its academic integrity policy online: <http://www.slu.edu/madrid/academics>. As a member of the University community, you are expected to know and abide by these policies, which detail definitions of violations, processes for reporting violations, sanctions and appeals.

The professor will review these matters during the first weeks of the term. Please direct questions about any facet of academic integrity to your faculty, the chair of the department of your academic program, or the Academic Dean of the Madrid Campus.

University Title IX Statement: Saint Louis University and its faculty are committed to supporting our students and seeking an environment that is free of bias, discrimination, and harassment. If you have encountered any form of sexual misconduct (e.g. sexual assault, sexual harassment, stalking, domestic or dating violence), we encourage you to report this to the University. If you speak with a faculty member about an incident of misconduct, that faculty member must notify SLU's Title IX deputy coordinator, Marta Maruri, whose office is located on the ground floor of Padre Rubio Hall, Avenida del Valle, 28 (mmaruri@slu.edu; 915-54-5858, ext. 213) and share the basic fact of your experience with her. The Title IX deputy coordinator will then be available to assist you in understanding all of your options and in connecting you with all possible resources on and off campus.

If you wish to speak with a confidential source, you may contact the counselors at the SLU-Madrid's Counseling Services on the third floor of San Ignacio Hall (counselingcenter-madrid@slu.edu; 915-54-5858, ext. 230) or Sinews Multiplettherapy Institute, the off-campus provider of counseling services for SLU-Madrid (www.sinews.es; 917-00-1979). To view SLU-Madrid's sexual misconduct policy and for resources, please visit the following web address: <http://www.slu.edu/Documents/Madrid/campus-life/SLUMadridSexualMisconductPolicy.pdf>.

Students with Special Needs: In recognition that people learn in a variety of ways and that learning is influenced by multiple factors (e.g., prior experience, study skills, learning disability), resources to support student success are available on campus. Students who think they might benefit from these resources can find out more about:

- Course-level support (e.g., faculty member, departmental resources, etc.) by asking your course instructor.
- University-level support (e.g., tutoring/writing services, Disability Services) by visiting the Academic Dean's Office (San Ignacio Hall) or by going to <https://www.slu.edu/madrid/academics/student-resources>.

Students with a documented disability who wish to request academic accommodations must contact Disability Services to discuss accommodation requests and eligibility requirements. Once successfully registered, the student also must notify the course instructor that they wish to access accommodations in the course. Please contact Disability Services at disabilityservices-madrid@slu.edu or +915 54 58 58, ext. 230 for an appointment. Confidentiality will be observed in all inquiries. Once approved, information about the student's eligibility for academic accommodations will be shared with course instructors via email from Disability Services. For more information about academic accommodations, see "Student Resources" on the SLU-Madrid webpage.

Note: Students who do not have a documented disability but who think they may have one are encouraged to contact Disability Services.

Spring 2018 Course Schedule:

JANUARY	
Wednesday 10	First Day of Classes
Thursday 11	Introduction and basic concepts
Friday 12	
Monday 15	
Tuesday 16	Introduction and basic concepts
Wednesday 17	
Thursday 18	Heat and Efficiency
Friday 19	
Sunday 21	Last Day to Drop a Class without a Grade W and/or Add a Class; Last Day to Choose Audit (AU) or Pass/No Pass (P/NP) Options
Monday 22	
Tuesday 23	Heat and Efficiency
Wednesday 24	
Thursday 25	Heat and Efficiency
Friday 26	No Classes Application Deadline for Spring Semester Degree Candidates
Monday 29	
Tuesday 30	Properties of Pure Substances
Wednesday 31	
FEBRUARY	
Thursday 1	Analysis of Closed Systems
Friday 2	
Monday 5	
Tuesday 6	Analysis of Closed Systems
Wednesday 7	
Thursday 8	Ideal Gas State
Friday 9	
Monday 12	
Tuesday 13	Analysis of Control Volumes
Wednesday 14	Ash Wednesday Registration for Summer 2018 Begins
Thursday 15	MIDTERM 1 (To be agreed during class)
Friday 16	
Monday 19	
Tuesday 20	Analysis of Control Volumes
Wednesday 21	
Thursday 22	No Classes (Winter Break)
Friday 23	
Monday 26	
Tuesday 27	Professors' Deadline to Submit Midterm Grades Intro to the Second Law of Thermodynamics
Wednesday 28	
MARCH	
Thursday 1	Intro to the Second Law of Thermodynamics
Friday 2	
Monday 5	
Tuesday 6	Intro to the Second Law of Thermodynamics
Wednesday 7	
Thursday 8	Intro to the Second Law of Thermodynamics
Friday 9	Last Day to Drop a Class and Receive a Grade of W
Monday 12	

Tuesday 13	Entropy
Wednesday 14	
Thursday 15	Last Day to Submit Transfer Application for Fall Semester Entropy
Friday 16	
Monday 19	
Tuesday 20	Power Cycles
Wednesday 21	
Thursday 22	Power Cycles
Friday 23	
Monday 26	<i>Semana Santa</i> Holiday (Campus Closed)
Tuesday 27	
Wednesday 28	
Thursday 29	<i>Jueves Santo</i> (Campus Closed)
Friday 30	<i>Viernes Santo</i> (Campus Closed)
APRIL	
Monday 2	
Tuesday 3	Biological Thermodynamics
Wednesday 4	Registration for Fall 2018 Semester Begins
Thursday 5	Biological Thermodynamics
Friday 6	
Monday 9	
Tuesday 10	Heat Transfer Mechanics
Wednesday 11	
Thursday 12	Heat Transfer Mechanics
Friday 13	
Monday 16	
Tuesday 17	Refrigeration Cycles
Wednesday 18	
Thursday 19	Refrigeration Cycles
Friday 20	
Monday 23	
Tuesday 24	Additional Topics
Wednesday 25	
Thursday 26	Additional Topics
Friday 27	
Monday 30	
MAY	
Tuesday 1	<i>Día del Trabajador</i> (Campus Closed)
Wednesday 2	<i>Día de la Comunidad</i> (Campus Closed)
Thursday 3	Spring 2018 Final Day of Classes
Friday 4	Spring 2018 Final Exams
Monday 7	
Tuesday 8	
Wednesday 9	
Thursday 10	
Friday 11	University Housing Move-out Date
Saturday 12	Commencement
Sunday 13	Professors' deadline to submit spring 2018 final grades

Due to travel commitments there will be no class on March 15th, March 20th and 22th. These class sessions will be recovered during the semester at the most convenient time.

Final Exam Schedules Spring 2018

	4 May (Fr)	7 May (Mn)	8 May (Tu)	9 May (Wd)	10 May (Th)
08:30-11:30	Mn classes that meet at 9:00 & 9:30	Mn classes that meet at 10:00	Mn classes that meet at 11:00 & 11:30	Tu classes that meet at 9:30	Tu classes that meet at 8:00
12:00-15:00	Tu classes that meet at 11:00	Mn classes that meet at 13:00	Tu classes that meet at 14:30	Mn classes that meet at 12:00 & 12:30	Tu classes that meet at 12:30
15:30-18:30	Mn classes that meet at 14:30	Tu classes that meet at 17:00 & 17:30	Mn classes that meet at 16:00	Tu classes that meet at 16:00	Mn classes that meet at 17:30
19:00-22:00	---	---	Mn classes that meet at 18:30 & 19:00	Tu classes that meet at 19:00	---