

Syllabus

ME 1051 – Applied Thermodynamics

Spring Semester 2022

Lecture Times:	R 8:15~11:00 am	Instructor:	Dr. Jin Xu
Classroom:	4-203	Office:	4-219
Office Hours:	T&R 2~5 pm	Email:	jin.xu@scupi.cn

Teaching Assistant: Lisa Sha. **Email:** 3525625946@qq.com.

Catalog Description:

This 3-credit course covers thermodynamic processes involving energy and entropy changes in real and ideal gases, vapors, and liquids, and mixtures of those fluids. Main topics include basic thermodynamic cycles (vapor and gas power, refrigeration, and heat pumps), air-water mixtures and psychrometrics, thermodynamics of reactions and combustion, and applications to refrigeration, power plants and internal combustion engines. Prerequisite: *MEMS 0051*.

Course Outcomes:

- To develop additional thermodynamic tools for analyzing processes and systems.
- To understand entropy change and entropy generation of processes and systems.
- To apply principles of thermodynamics to analyze practical energy systems.
- To learn basic thermodynamic cycles and their application to real systems
- To become familiar with the practice of psychrometrics.
- To analyze the thermodynamics of reactions and combustion processes.
- To evaluate energy systems for efficient energy utilization, and to understand the impact of energy utilization on materials and the environment.

Required Textbook:

Claus Borgnakke and Richard E.Sonntag, Fundamentals of Thermodynamics, SI Version Global Edition.

Additional Reference:

Michael J. Moran, Howard N. Shapiro, Fundamentals of Engineering Thermodynamics, Wiley.

Course Policies:

Regular class attendance is expected. Each student is responsible for all of the material presented in class and in the reading assignments. Exams will emphasize treatment of material covered in lectures. In general, no late assignments will be accepted, or makeup exams given. Exceptions will be made for a valid excuse consistent with University Policy. If you cannot attend an exam or meet a due date, you must contact the instructor *prior to* the exam or due date. (Failure to do so will result in a zero on that exam/assignment.) Arrangements will be made for students on a case-by-case basis.

Integrity and Academic Expectations:

“Violations of academic integrity include, but are not limited to, cheating, plagiarism, or misrepresentation in oral or written form. Such violations will be dealt with severely, in accordance with University policy. Plagiarism means representing someone else’s idea or writing as if it were your own. If

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you use someone else's ideas or writing, be sure the source is clearly designated." It is expected that students adhere to the academic integrity policy that is presented in the Student's Honor Code of Conduct / Student Handbook.

Grading Policy:

Exams 1 & 2 = 20% each, Final = 35%, Homework = 15%, and Project = 10%. Please go to Grade Center on BB for up-to-date grades. Grades will **not** be curved, and the official SCU grading scale will be used when determining your final letter grade (based on the numerical grade).

90~100 = A	80~85 = B+	70~73 = C+	60~63 = D
85~ 90 = A-	76~80 = B	66~70 = C	< 60 = F
	73~76 = B-	63~66 = C-	

Exam Schedule:

Exam 1: Apr. 7th, Exam 2: May 12th, and Final: June 16th.

Students with Disabilities:

If you have special needs because of a learning, physical, or other disability, please contact the instructor in advance so accommodations will be provided in a timely manner.

Tentative Course Schedule:

Week	Date	Topics
1	2/24	Course Overview and Cycle Analysis
2	3/3	Calculation and Use of Entropy
3	3/10	Phase-change power cycles
4	3/17	Phase-change power cycles
5	3/24	Gas power cycles
6	3/31	Exam Review
7	4/7	Exam #1
8	4/14	Gas power cycles
9	4/21	Refrigeration and heat pump cycles
10	4/28	Refrigeration and heat pump cycles
11	5/5	Nonreacting ideal gas mixtures and Exam Review
12	5/12	Exam #2

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13	5/19	Nonreacting ideal gas mixtures and psychrometrics
14	5/26	Thermodynamics of combustion and reactions
15	6/2	Thermodynamics of combustion and reactions
16	6/9	Exam Review
17	6/16	Final Exam
18	6/23	Final Grades Posted on BB
19	6/30	End of Semester