

Alanya Alaaddin Keykubat University | Rafet Kayış Faculty of Engineering
Genetics and Bioengineering Department
 2026-2027 Fall Semester

Syllabus

Code/Name	GBM 207 / THERMODYNAMICS
Type	Required
Credit/ECTS	3/3
Hour per Week	3
Level/Year	Undergraduate/2
Semester	Fall
Classroom	D306
Content	Learning fundamental principles of thermodynamics and applying them to evaluate the fundamental thermodynamic aspects of the biological systems
Prerequisites	n/a
Textbooks	Primary • Cengel Y.,Boles M. A.,Kanoglu M., Thermodynamics An Engineering Approach, McGrawHill, ninth ed. • Smith J.M., Van Ness H. C., Abbott M. M., Swihart M. T., Chemical Engineering Thermodynamics McGrawHill, ninth ed. • Haynie D. T. Biological Thermodynamics, Cambridge, second ed. •
Objectives	• Introducing the basic concepts of thermodynamics • Knowledge of the 1st and 2nd laws of thermodynamics • Defining of the molecular side of thermodynamics • Formulating and solving energy and entropy balances in closed and open systems
Course Outcomes	CO1. Demonstrate knowledge and skills to explain the fundamental principles of thermodynamics CO2. To be able to analyze the laws of thermodynamics. CO3. Apply the principles of thermodynamics to various engineering problems CO4. Solve practical problems, incorporating real-world applications CO5. Relate the laws of thermodynamics to bioengineering problems and in biological systems

Weekly Schedule of Topics

W	Topic
1	Introduction to thermodynamics and basic concepts
2	Open and close systems
3	Properties of Pure substances
4	Energy and types of energy
5	The 1 st law of thermodynamics
6	Applications of 1 st law - open&close systems
7	Tutorials – problem solving
8	The 2 nd Law of Thermodynamics
9	The applications of 2 nd Law – reversible& irreversible Heat machines
10	Entropy
11	Entropy and its application II
12	Exergy: Work Potential of Energy

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13	Thermodynamics in biological systems
14	Tutorials – problem solving

Professional Contribution Be able to get knowledge about thermodynamics and their application areas

Contribution to Program Outcomes*

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11
CO1	5	4	3	2	1	0	0	0	1	0	0
CO2	4	5	5	3	2	0	0	0	1	0	0
CO3	5	5	4	3	2	0	0	0	1	0	0
CO4	5	5	5	3	3	2	0	0	1	0	0
CO5	5	5	5	3	3	2	0	1	1	0	0

* Contribution Level | 0: None | 1: Very Low | 2: Low | 3: Medium | 4: High | 5: Very High

Special Conditions	Students work in groups for writing
Requirements	Knowledge of Mathematics and Physics
Course Policy	• Students should be in the class on time. • Both student and responsible lecturer should communicate in English • Students should prepare themselves by reading course presentation, book and articles sent. • At least 70% attendance is required, otherwise a grade of DZ will be assigned.
Evaluation	Midterm Exam 40% <u>Final exam</u> 60% Total 100%

Instructor			
Name/Surname	Şeref Akay	Email	seref.akay@alanya.edu.tr
Room	322	Office Hours	Wednesday 14:30-15:30 Thursday 09:30-10:30

Prepared by Şeref Akay in September, 2026