Alanya Alaaddin Keykubat University | Rafet Kayış Faculty of Engineering
Genetics and Bioengineering Department
2024-2025 Fall Semester

Syllabus

Code/Name	GBM 209 / THERMODYNAMICS
Type	Required
Credit/ECTS	3/3
Hour per Week	3
Level/Year	Undergraduate/2
Semester	Fall
Classroom	D105
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. • Özilgen M., Sorgüven E., Biothermodynamics: Principles and Applications, CRC Press. ***Supplementary*** Research article published in such library as PUBMED, ELSEVIER
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 • Having experience of group study
Course Outcomes	CO1. Demonstrate knowledge and skills to analyze bioengineering thermodynamic problems with the help of mathematics and science CO2. To be able to analyze the laws of thermodynamics CO3. To have ability to apply the laws of thermodynamics to bioengineering problems and in biological systems CO4. To solve engineering problems in thermodynamics independently or in teams CO5. To access bioengineering literature and databases for research

Weekly Schedule of Topics

W	Topic
1	Introduction to thermodynamics
2	Basic concept of thermodynamics Open and close systems Engineering calculations
3	Energy and types of energy
4	The 1st law of thermodynamics and applications of 1st law Enthalpy
5	The properties of pure substances
6	Tutorials – problem solving
7	Republic day
8	Group writing criteria

	Training to use referencing program
9	The 2nd Law of Thermodynamics
10	The applications of 2nd Law – reversible& irreversible Heat machines
11	Tutorials – problem solving Group writing meetings
12	Entropy and its application
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	4	4	0	4	0	0	0	4	0	0	0
CO2	4	4	0	4	0	0	0	4	0	0	0
CO3	4	4	4	2	4	1	0	3	2	2	0
CO4	4	4	0	3	3	2	2	4	5	1	0
CO5	4	4	0	3	4	0	0	5	4	0	3

* 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 7**0%** attendance is required, otherwise a grade of **DZ** will be assigned. • Students must submit their essays to Turnitin assignment, otherwise students will not be graded for the group writing.
Cheating & Plagiarism	• Copying or letting someone copy anyone work on exams, assignments, or reports is cheating. • Cutting and pasting text, figures and tables from web sources, chatGPT or any other electronic source is plagiarism. • The consequence of academic dishonesty is to receive a grade of **FF** for the course.
Evaluation	Quiz (5 quizzes) 10 % Group writing 20 % Midterm Exam 30% Final exam 40% Total 100%
Rubric	A rubric will be announced prior to submission of group writing. The rubric has 2 main parts for the grading: technical assessment and writing performance for each student in student groups.

Instructor

Name/Surname	Özge Güzel	Email	**Ozge.guzel@alanya.edu.tr**
Room	321	Office Hours	Tuesday 13:30-15:30 Wednesday 13:30-15:30

Prepared by Özge Güzel in October, 2024