

Course Information								
Course Code	T	P	L	C	ECTS	Type C/E	Language TR/ENG etc.	Year/Semester
FİZ3003	3	2	0	4	5	C	TR	3/FALL
Course Name (Turkish)	Termodinamik							
Course Name (English)	Thermodynamic							

Unit/Program	Physics Department/Undergraduate Program			
Course Prerequisite	No			
Course Objectives	By teaching concepts such as temperature, heat, work and the laws of thermodynamics, students understand the effects of temperature on the physical properties of materials.			
Course Outline	Study of the physical behavior of substances against temperature Temperature, Heat and the Laws of Thermodynamics			
Textbook/ Material / Resources	1.Lecture Notes: Heat and Thermodynamics, Enis Erdik 2.Thermodynamics Ahmet Rasim Büyük Uludag University Press House			
Internship Status	No			
Course Precedents				
University Name	Program Name	Course Name	T-P-L-C; ECTS	Type
Erciyes University	Physics	Thermodynamics	2-0-0-3; 3	C
Eskisehir Osmangazi University	Physics	Thermodynamics and Statistical Physics	4-0-0-4; 7	C
The instructor who proposed the course ( Title, Name and Surname)			Signature	
Instructors who can teach the course (Title, Name and Surname)			Signature	

Academic justification for the opening of the course? (The effect of course outcomes on program outcomes, etc.)
ECTS update for FİZ303 course

Brief explanation of the course (theoretical lecture, applications, laboratory, studio, off-campus activity, using software, etc.)
It will be processed in a face-to-face laboratory environment under the supervision of the relevant faculty members.

External Stakeholder Opinions About the Course (It is expected that the opinions to be obtained from the business world that will employ your graduates or from real or legal persons outside the University who have expertise on the subject of the course will be specified. Proof documents must be attached to this form.)	
Stakeholder Name	Opinion (It should be given as a summary, it should not exceed two lines.)

Weekly Course Content Distribution		
Week	Theory	Application/Laboratory
1	Temperature and thermometry: Division of thermometers, temperature scales problem solution	
2	Thermal Expansion: Linear, Surface and Volume Expansion Coefficients of Solids and Expansion Events, thermal expansion of fluids,	
3	Real and Apparent Expansion Coefficients of a Liquid, Abnormal Expansion of Water Problem Solution	
4	Heat and Calorimeter: Heat Energy and Units, Heat Capacity, Melting and Evaporation (Latent Heat) Temperatures, Self-Heat and Latent with the Method of Mixtures	
5	Determination of Self-Heat by Cooling Method of a Liquid, Determination of Self-Heat by Electrical Methods Determination, Determination of Self-Heat Using Ice, Self-Heat and Dulong-Petit Law Problem Solution	
6	Phase Changes (State Changes): States of Matter and Melting-Freezing, Supercooling, The Effect of Pressure on Melting Point, Le Chatelier's Principle and Clausius-Clapeyron Equation,	
7	Evaporation, saturated vapor pressure, boiling, phase diagrams.	
8	Ideal Gases, Gas Laws: Thermal Expansion of Gases. Gay-Lussac, Charles and Dalton's Law of Partial Pressures, How the Density of a Gas Changes with Temperature and Pressure	
9	Midterm Exam	
10	External Work, Cycle, Intrinsic Heat Functions of a Gas: External Work Done by an Expanding Gas, Determination of Specific Heats $C_p$ and $C_v$ , $C_p/C_v$ of a gas	
11	Work and Enthalpy in Isothermic, Isochoric, Isobaric and Adiabatic Changes, Experiments for the Cooling of a Gas. Joule-Kelvin Effect, Liquefaction of Gases Linde Method, Determination of Critical Points	
12	Laws of thermodynamics and areas of application	
13	Carnot Cycle and Finding Its Theoretical Efficiency from the P-V Diagram, Obtaining the efficiency of the Carnot cycle from the T-S diagram, These Concepts and Processing Coefficient,	
14	Heat Engines and Efficiency, Rankine (Steam Engine) Cycle, Otto (Gasoline Engine) Cycle and Diesel Engine Cycles and Efficiencies,	
15	Make-up Exam	
16		

Assessment			
Evaluation Criteria	Activity	Custom	Contribution to Success Grade (%)
	Midterm Exams	1	40
	Quizzes		
	Assignments		
	Projects		
	Term Paper		
	Laboratory		
	Other		
	Final Exam	1	60
	Sum:		100
Remarks			

<b>Content Design and Subject Weight (%)</b>	Mathematics and Basic Sciences	100
	Engineering Sciences	
	Social Sciences	
	Health Sciences	
	Educational Sciences	
	Culture and Art Sciences	
	Design Information	

<b>Workload (ECTS) Calculation</b>			
Events	Number	Duration (Hours)	Total workload (Hours)
Fieldwork			
Midterm Exam Application	1	2	2
Self-Study (including pre-class and exam preparation)	9	3	27
Make-up Exam	1	2	2
Experiment and Observation			
Class Participation (Theory)	14	5	70
Homework			
Final Exam Practice	1	2	2
Laboratory			
Article Review			
Writing an Article			
Reading			
Case Study			
Performance			
Problem Solution	14	2	28
Project Preparation			
Project Submission			
Quiz			
Report Preparation			
Submitting Reports			
Role/Drama Work			
Seminar			
Oral Exam			
Team/Group Work			
Argument			
Application/Practice			
Other			
<b>TOTAL WORKLOAD:</b>			<b>131</b>
<b>ECTS CREDITS OF THE COURSE:</b> (The number obtained as a result of Total Workload/25 is calculated by rounding to the whole number.)			<b>5</b>

<b>Program Outcomes (PO)</b>		1	2	3	4	5	6	7	8	9	10	11
<b>Learning Outcomes (LO) (Course Outcomes)</b>												
1	To be able to use thermodynamic terminology in theoretical and experimental studies	5	4	4	4	5	4	5	5	4	3	4
2	To be able to interpret thermal phenomena observed in nature or used in technological applications	5	4	4	4	5	4	5	5	4	3	4
3	To be able to model basic cyclic systems	5	4	4	4	5	4	5	5	4	3	4

**Organizer:** Prof. Dr. Cengiz TATAR

**Preparation Date:** 20.05.2024