



AYDIN ADNAN MENDERES UNIVERSITY COURSE INFORMATION FORM

Course Title		Advanced Thermodynamics							
Course Code		MME626		Course Level		Third Cycle (Doctorate Degree)			
ECTS Credit	9	Workload	231 (<i>Hours</i>)	Theory	3	Practice	0	Laboratory	0
Objectives of the Course		Provide graduate students with advanced thermodynamic knowlege required by real problems.							
Course Content		General foundations of thermodynamics valid for small and large systems, and equilibrium and nonequilibrium states. Definitions of work, energy, stable equilibrium, available energy, entropy, thermodynamic potential, and interactions other than work (nonwork, heat, mass transfer). Applications to properties of materials, bulk flow, energy conversion, chemical equilibrium, and industrial manufacturing.							
Work Placement		N/A							
Planned Learning Activities and Teaching Methods				Explanation (Presentation), Demonstration, Discussion, Project Based Study, Individual Study, Problem Solving					
Name of Lecturer(s)									

Prerequisites & Co-requisites

Language Requisite	Yes
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Assessment Methods and Criteria

Method	Quantity	Percentage (%)
Midterm Examination	1	15
Final Examination	1	60
Quiz	4	15
Assignment	5	5
Term Assignment	1	5

Recommended or Required Reading

1	Bejan A., Advanced Engineering Thermodynamics, 2nd Edition, John Wiley & Sons, 1997
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Week	Weekly Detailed Course Contents	
1	Theoretical	General foundations of thermodynamics valid for small and large systems, and equilibrium and nonequilibrium states.
2	Theoretical	General foundations of thermodynamics valid for small and large systems, and equilibrium and nonequilibrium states.
3	Theoretical	General foundations of thermodynamics valid for small and large systems, and equilibrium and nonequilibrium states.
4	Theoretical	General foundations of thermodynamics valid for small and large systems, and equilibrium and nonequilibrium states.
5	Theoretical	Definitions of work, energy, stable equilibrium, available energy, entropy, thermodynamic potential, and interactions other than work (nonwork, heat, mass transfer).
6	Theoretical	Definitions of work, energy, stable equilibrium, available energy, entropy, thermodynamic potential, and interactions other than work (nonwork, heat, mass transfer).
7	Theoretical	Definitions of work, energy, stable equilibrium, available energy, entropy, thermodynamic potential, and interactions other than work (nonwork, heat, mass transfer).
8	Intermediate Exam	Midterm exam
9	Theoretical	Applications to properties of materials, bulk flow, energy conversion, chemical equilibrium, and industrial manufacturing.
10	Theoretical	Applications to properties of materials, bulk flow, energy conversion, chemical equilibrium, and industrial manufacturing.
11	Theoretical	Applications to properties of materials, bulk flow, energy conversion, chemical equilibrium, and industrial manufacturing.
12	Theoretical	Applications to properties of materials, bulk flow, energy conversion, chemical equilibrium, and industrial manufacturing.
13	Theoretical	Applications to properties of materials, bulk flow, energy conversion, chemical equilibrium, and industrial manufacturing.
14	Theoretical	Applications to properties of materials, bulk flow, energy conversion, chemical equilibrium, and industrial manufacturing.



15	Theoretical	Applications to properties of materials, bulk flow, energy conversion, chemical equilibrium, and industrial manufacturing.
16	Final Exam	Final Exam

Workload Calculation

Activity	Quantity	Preparation	Duration	Total Workload
Lecture - Theory	16	2	4	96
Assignment	5	10	0	50
Term Project	1	15	10	25
Quiz	4	3	1	16
Midterm Examination	1	20	2	22
Final Examination	1	20	2	22
Total Workload (Hours)				231
[Total Workload (Hours) / 25*] = ECTS				9

*25 hour workload is accepted as 1 ECTS

Learning Outcomes

1	To learn chemical reactions and chemical equilibrium
2	To learn homogenous mixtures, multiphase multicomponent systems
3	To learn availability analysis, equations of state
4	To learn laws of thermodynamics, thermodynamic relations
5	Ability to inspect relevant systems according to thermodynamic relations

Programme Outcomes (Mechanical Engineering (English) Doctorate)

1	1. In Mathematics, natural sciences and mechanical engineering, department has the sufficient infrastructure; the ability to use the theoretical and practical information for engineering solutions
2	2. The ability to identify, define, and solve the formula for complex engineering problems; the ability to select and apply for the appropriate analytical methods and modelling techniques
3	3. To meet desired needs of a system, system component, or process, analysing and designing skill under realistic constraints; in this respect, the ability to apply the methods of modern design
4	4. The ability to use and choose modern techniques and tools for required engineering applications and; the ability to use information technology effectively
5	5. The ability to design the experiment, collect the data for the experiment and interpret to analysing results
6	6. The ability to use computer software and hardware information, access to information and other information sources
7	7. The ability to work individually and with multidisciplinary teams effectively, taking responsibility self-confidence for complex situations
8	8. The ability to communicate with foreign colleagues by having high level of foreign language knowledge in the field of engineering
9	9. Monitoring the science and technology developments and the ability to renew itself with innovative ideas constantly
10	10. Professional and ethical responsibility awareness
11	11. Having an adequate information and awareness in the subjects of occupational safety, occupational health, social security rights, quality control and management issues of environmental protection
12	12. The ability to appreciate the effects of engineering solutions and applications in universal and social dimensions
13	13. The ability to be enlightened to the experts or non-expert audience groups on the issues related with engineering problems and solutions written and oral
14	14. The ability to have adequate knowledge and skills in the project development and application, manage the activities planning, including the projects to the employees having the responsibility of the project by increasing vocational awareness

Contribution of Learning Outcomes to Programme Outcomes 1:Very Low, 2:Low, 3:Medium, 4:High, 5:Very High

	L1	L2	L3	L4	L5
P1	3	5	4	5	5
P2	3	5	3	4	5
P3	3	5	3	4	5
P4	3	3	5	3	4
P5	4	4	3	4	4
P6	3	4	3	5	4
P7	4	3	5	3	3



P8	3	4	5	4	3
P9	3	4	3	5	4
P10	4	5	3	4	5
P11	3	5	4	5	5
P12	3	5	3	5	4
P13	5	4	5	3	3
P14	4	4	5	3	5

