
		UNIVERSITY OF EAST SARAJEVO				
		Faculty of Technology				
		Study program: <i>Chemical engineering and technology</i>				
		I STUDY CYCLE	II STUDY YEAR			
<b>Course name</b>		ENGINEERING THERMODYNAMICS				
<b>Department</b>		Department for process engineering-Faculty of Technology				
Course code		Course status		Semester	ECTS	
		Obligatory		III	6	
<b>Teacher</b>		PhD Mitar Perusic, full professor				
<b>Assistant</b>		Dusko Kostic, assistant				
Hours number (weekly)			Individual work (hours per semester)			Student's work coefficient, $S_0$
Lectures	Class Exercises	Laboratory Exercises	Lectures	Class Exercises	Laboratory Exercises	$S_0$
3	2	0	45	30	0	1.4
Total hours number (hours per semester) $3*15 + 2*15 + 0*15 = 75$			Total hours number (hours per semester) $3*15*1.40 + 2*15*1.40 + 0*15*1.40 = 105$			
Total hours number (hours per semester, teacher + student): $75 + 105 = 180$						
<b>Learning outcomes</b>		<ol style="list-style-type: none"> <li>To find and use literature data related to energy and thermodynamics of the system;</li> <li>To recognize the thermodynamic system, knowledge of the thermodynamic properties of ideal and real gases and vapors;</li> <li>Mathematically analyze energy transfer across the boundaries of the thermodynamic system;</li> <li>Analyze thermodynamic cycles;</li> <li>Analyze, solve, present task solutions and compare results, and recognize the application and importance of thermodynamics in practice. Know the difference between an ideal and a real thermodynamic process.</li> </ol>				
<b>Conditionality</b>		No.				
<b>Teaching methods</b>		Lectures, class exercises and individual work				
<b>Course content per weeks</b>		<ol style="list-style-type: none"> <li>Introduction to the course. Basic concepts of thermodynamics. The concept and forms of energy. Units and dimensions.</li> <li>Ideal gas. Ideal gas equation-thermodynamic aspects.</li> <li>Working body energy. Internal energy and amount of heat. Thermal capacity.</li> <li>The term thermodynamic system. The first principle of thermodynamics, definition and mathematical model.</li> <li>The concept of enthalpy. Examples of enthalpy changes in the thermodynamic system in chemical reactions. State changes in the p-v coordinate system.</li> <li>The second principle of thermodynamics. Entropy and mathematical model of the second principle of thermodynamics. Examples of the change in entropy of a thermodynamic system in chemical reactions. Colloquium 1.</li> <li>Reverse and irreversible processes. Circular processes.</li> <li>Thermal T-s diagram and state changes.</li> <li>Invert the Carnot cycle.</li> <li>Joule return cycle.</li> <li>Maximum operation.</li> <li>Real gases and vapors. Deviations from the ideal gas equation of state.</li> <li>Phase transformations and latent heat. Water and physicochemical properties of water. Water vapor as a working medium.</li> <li>Diagrams p-v, T-s and h-s for water vapor.</li> <li>Carnot's and Rankin-Clausius cycle for water vapor. Analysis of engineering thermodynamics chapters (seminar paper presentation). Colloquium 2.</li> </ol>				
Obligatory literature						
Author/s	Name, publisher			Year	Page	
D. Malic	Thermodynamic and Thermotechnik, GK, Beograd, 7 <sup>th</sup> issue			1977	1-92	
Additional literature						
Author/s	Name, publisher			Year	Page	
B. Pejovic, M. Perusic	Thermodynamic for engineers-solution manual, Faculty of Technology			2012	1-332	
M. Novakovic, M. Djuric	Technical thermodynamic, Faculty of Technology, Novi Sad			1998	1-304	

O. Singh	Applied Thermodynamics, New Age International Limited	2006	1-330	
B. Djordjevic, V. Valent, S. Serbanovic	Solution manual, Thermodynamic and Thermotechnic, TMF, Belgrade	2004	1-223	
<b>Obligations, types of knowledge evaluation, final assessment</b>	<b>Types of evaluation</b>		<b>Points</b>	<b>Percentage</b>
	Pre-exam obligation			
	Lectures and exercises participation and activity		6	6 %
	Seminar work		14	14 %
	Colloquium 1		25	25 %
	Colloquium2		25	25 %
	Final exam			
	Final exam (verbal)		30	30 %
TOTAL		100	100 %	
<b>Web pages</b>	<a href="http://www.tfzv.ues.rs.ba">www.tfzv.ues.rs.ba</a>			
<b>Date</b>				