

<b>STUDY MODULE DESCRIPTION FORM</b>		
Name of the module/subject <b>Technical Thermodynamics</b>		Code <b>1010601111010630911</b>
Field of study <b>Mechanical Engineering</b>	Profile of study (general academic, practical) <b>(brak)</b>	Year /Semester <b>1 / 1</b>
Elective path/specialty <b>Aircraft Engines</b>	Subject offered in: <b>Polish</b>	Course (compulsory, elective) <b>obligatory</b>
Cycle of study: <b>Second-cycle studies</b>	Form of study (full-time, part-time) <b>full-time</b>	
No. of hours Lecture: <b>1</b> Classes: <b>1</b> Laboratory: <b>-</b> Project/seminars: <b>-</b>		No. of credits <b>2</b>
Status of the course in the study program (Basic, major, other) <b>(brak)</b>		(university-wide, from another field) <b>(brak)</b>
Education areas and fields of science and art <b>technical sciences</b> <b>Technical sciences</b>		ECTS distribution (number and %) <b>2 100%</b> <b>2 100%</b>
<b>Responsible for subject / lecturer:</b>  Prof. PP dr hab inż. Leon Bogusławski email: leon.boguslawski@put.poznan.pl tel. 2212 Wydział Maszyn Roboczych i Transportu <a href="http://www.fwmt.put.poznan.pl/">http://www.fwmt.put.poznan.pl/</a>		
<b>Prerequisites in terms of knowledge, skills and social competencies:</b>		
1	<b>Knowledge</b>	Basic knowledge about fundamentals of thermodynamics and processes of energy conversion in thermal equipments
2	<b>Skills</b>	Ability to describe and calculate the basic thermodynamics processes and primary energy conversion systems
3	<b>Social competencies</b>	Is able to improve professional competencies and be ready to collaborate in team
<b>Assumptions and objectives of the course:</b> Introduction to basic thermodynamics processes, description of energy conversion processes		
<b>Study outcomes and reference to the educational results for a field of study</b>		
<b>Knowledge:</b>		
1. Has a basic knowledge of technical thermodynamics and energy conversion		- [K1A_W08]
<b>Skills:</b>		
1. Is able to perform technical calculations in thermodynamics		- [K1A_U17]
<b>Social competencies:</b>		
1. Understand the need and knows the possibility of lifelong learning		- [K1A_K01, K1A_K04]
<b>Assessment methods of study outcomes</b>		
Exam		
<b>Course description</b>		
Introduction. Basic relations. Ideal and real gases. Thermodynamics cycles. I and II law of thermodynamics. Efficiency of thermodynamics cycles. Thermodynamics of water dump and humanity air. Introduction to heat transfer. Clausius-Rankin cycles. Internal combustion engines cycles.		

<b>Basic bibliography:</b>		
1. Kalinowski E.: Termodynamika, Wyd. P. Wr. 1994		
2. Szargut J.: Termodynamika techniczna, Wyd. P. Śl. 1997		
3. Wiśniewski St.: Termodynamika techniczna, WNT 1995		
4. Tuliszka E. Red.: Termodynamika techniczna. Zbiór zadań, Nr 889, Wyd. P.P. 1980		
5. Gumiński K. Termodynamika, PWN Warszawa 1972		
6. Michałowski St., Wańkowicz K., Termodynamika procesowa, WNY, Warszawa 1999		
7. Kestin J.: Course in Thermodynamics, New York, Hemisphere 1979		
<b>Additional bibliography:</b>		
1. Tuliszka E.: Teoria maszyn ciepłych, Nr 511, Wyd. P.P. 1974		
2. Wiśniewski St., Staniszewski B., Szymanik R., Termodynamika procesów nierównowagowych, PWN, Warszawa 1973		
3. M.J. Morano, H.N. Shapiro: Fundamentals of Engineering Thermodynamics, John Wiley & Sons, New York, 1998		
<b>Result of average student's workload</b>		
<b>Activity</b>	<b>Time (working hours)</b>	
1. Udział w wykładzie	15	
2. Utrwalanie treści wykładu	10	
3. Konsultacje	2	
4. Przygotowanie do ćwiczeń	15	
5. Przygotowanie do egzaminu	10	
6. Udział w egzaminie	2	
<b>Student's workload</b>		
<b>Source of workload</b>	<b>hours</b>	<b>ECTS</b>
Total workload	54	2
Contact hours	20	0
Practical activities	0	0