



### MODULE SPECIFICATION

Module code	
Module title in Polish	Wentylatory i sprężarki
Module title in English	Fans and Compressors
Module running from the academic year	2016/2017

### A. MODULE IN THE CONTEXT OF THE PROGRAMME OF STUDY

Field of study	Environmental Engineering
Level of qualification	first cycle (first cycle, second cycle)
Programme type	academic (academic/practical)
Mode of study	full-time (full-time/part-time)
Specialism	Water Supply, Treatment of Wastewater and Solid Waste
Organisational unit responsible for module delivery	The Department of Geotechnical, Geomatics and Waste Management
Module co-ordinator	Bartosz Szelaąg, PhD, Eng.
Approved by:	Maria Żygadło, Professor, PhD hab., Eng.

### B. MODULE OVERVIEW

Module type	programme-specific module (core/programme-specific/elective HES*)
Module status	compulsory module (compulsory/optional)
Language of module delivery	English
Semester in the programme of study in which the module is taught	semester 5
Semester in the academic year in which the module is taught	winter semester (winter semester/summer semester)
Pre-requisites	None (module code/module title, where appropriate)
Examination required	No (Yes/No)
ECTS credits	1

\* elective HES – elective modules in the Humanities and Economic and Social Sciences

Mode of instruction	lectures	classes	laboratories	project	others
Total hours per semester	15				



### C. LEARNING OUTCOMES AND ASSESSMENT METHODS

<b>Module aims</b>	The aims of the module include: learning the principle of operation, types, and characteristics of particular types of fans and compressors applied in ventilation and air conditioning systems (as well as their structure).
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Module outcome code	Module learning outcomes	Mode of instruction (l/c/lab/p/ others)	Corresponding programme outcome code	Corresponding discipline-specific outcome code
W_01	A student knows basic concepts, the characteristics, demand for power, operational range of fans and compressors (as well as the principles of regulation methods and co-operation with the network).	l	IŚ_W10	T1A_W04 T1A_W05 T1A_W06 T1A_W07
W_02	A student is familiar with the structure and characteristics of axial and radial fans, piston, helical, rotary, and spiral compressors (as well as compressing aggregates).	l	IŚ_W10	T1A_W04 T1A_W05 T1A_W06 T1A_W07
W_03	A student knows the principles of selecting fans.	l	IŚ_W10	T1A_W04 T1A_W05 T1A_W06 T1A_W07
U_01	A student can select fans and compressors for installation.	l	IŚ_U03 IŚ_U19	T1A_U02 T1A_U03 T1A_U05 T1A_U07 T1A_U08 T1A_U09 T1A_U10 T1A_U11 T1A_U13 T1A_U14 T1A_U15 T1A_U16
K_01	A student can formulate conclusions and describe the results of the obtained work.	l	IŚ_K07	T1A_K07

#### Module content:

1. Topics to be covered in the lectures

No.	Topics	Module outcome code
1.	Fans: basic notions, characteristics, demand for power, and operational range.	W_01 U_01
2.	Axial and radial fans, the selection of fans.	W_02 W_03 U_01
3.	Drive, regulation methods and the co-operation with the network.	W_01 U_01
4.	Axial and helical compressors.	W_02 U_01
5.	Rotary compressors with rotational pistons, spiral compressors.	W_02 U_01
6.	Multi-degree compression (compressor units).	W_02 U_01

#### Assessment methods



Module outcome code	Assessment methods <i>(Method of assessment; for module skills – reference to specific project, laboratory and similar tasks)</i>
W_01	A test
W_02	A test
W_03	A test
U_01	A test
K_01	A test

### D. STUDENT LEARNING ACTIVITIES

ECTS summary		
	Type of learning activity	Study time/ credits
1	Contact hours: participation in lectures	15
2	Contact hours: participation in classes	
3	Contact hours: participation in laboratories	
4	Contact hours: attendance at office hours (2-3 appointments per semester)	5
5	Contact hours: participation in project-based classes	
6	Contact hours: meetings with a project module leader	
7	Contact hours: attendance at an examination	
8		
9	<b>Number of contact hours</b>	<b>20</b> <i>(total)</i>
10	<b>Number of ECTS credits for contact hours</b> <i>(1 ECTS credit = 25-30 hours of study time)</i>	<b>0.8</b>
11	Private study hours: background reading for lectures	3
12	Private study hours: preparation for classes	2
13	Private study hours: preparation for tests	
14	Private study hours: preparation for laboratories	
15	Private study hours: writing reports	
16	Private study hours: preparation for a final test in laboratories	
17	Private study hours: preparation of a project/a design specification	
18	Private study hours: preparation for an examination	
19		
20	<b>Number of private study hours</b>	<b>5</b> <i>(total)</i>
21	<b>Number of ECTS credits for private study hours</b> <i>(1 ECTS credit = 25-30 hours of study time)</i>	<b>0.2</b>
22	<b>Total study time</b>	<b>25</b>
23	<b>Total ECTS credits for the module</b> <i>(1 ECTS credit = 25-30 hours of study time)</i>	<b>1</b>
24	<b>Number of practice-based hours</b> <i>Total practice-based hours</i>	
25	<b>Number of ECTS credits for practice-based hours</b> <i>(1 ECTS credit = 25-30 hours of study time)</i>	



### E. READING LIST

References	<ol style="list-style-type: none"><li>1. Cengel Y.A., Heat Transfer – a practical approach, McGraw-Hill Higher Education, 2003</li><li>2. Cengel Y.A., Turner R.H., Fundamentals of Thermal – Fluid Sciences, McGraw-Hill Higher Education, 2001</li><li>3. Winterbone D.E., Advanced Thermodynamics for Engineers, John Wiley&amp;Sons, Inc, 1997</li><li>4. Wong Kau-Fui Vincent, Thermodynamics for engineers, Boca Raton: CRC Press, cop. 2000</li><li>5. Logan Earl, jr., Thermodynamics: processes and applications, New York: Marcel Dekker, Inc., 1999</li><li>6. Moran Michael J., Fundamentals of engineering thermodynamics, John Wiley &amp; Sons, cop. 2008 (2007), 6th ed.</li></ol>
Module website	<p><a href="http://turbolab.tamu.edu/proc/turboproc/T21/T21183-188.pdf">http://turbolab.tamu.edu/proc/turboproc/T21/T21183-188.pdf</a> <a href="https://books.google.pl/books?isbn=8121931827">https://books.google.pl/books?isbn=8121931827</a> <a href="http://www.cagi.org/pdfs/cagi-air-compressor-hp.pdf">http://www.cagi.org/pdfs/cagi-air-compressor-hp.pdf</a></p>