

## MODULE INFORMATION SHEET

<b>Name of Module Unit</b>	<b>Thermodynamics</b>
Name in Polish language	Termodynamika techniczna
Module type	compulsory
Form of studying	full-time
Level of study	undergraduate course (B.Sc. level)
Type of study ( for extra-mural courses)	-
Programme	Environmental Engineering
Specialty	Environmental Engineering
Responsible department	Department of Air Conditioning and Heating
Responsible person	dr inż. Piotr Narowski

Semester	Lectures(E)	Tutorials	Laboratory	Computer Exercises	Projects	ECTS
3	30 (Exam)	15	0	0	0	4

### Objectives (summary)

Common core from the field of the heat physics with the possibility of the application in heating and air-conditioning. This course enables understanding thermodynamic cycles applied e.g. for the purpose of electric current generation. During lectures, the methods for increasing the efficiency of these cycles will be presented. The presented theory of combustion concerns the efficiency of combustion processes and the reduction in exhaust emissions.

### Prerequisites

Physics, Mathematics

### Rules of integrated grade setting

$0.6 * \text{lecture mark} + 0.4 * \text{tutorial mark}$

### Recommended readings

1. Cengel Y. A., Boles M. A.: *Thermodynamics (in SI Units): An Engineering Approach*, McGraw-Hill, 2014
2. Wark K., Richards D.E.: *Thermodynamics*, WCB McGraw-Hill, 1999
3. Kestin J.: *Course in Thermodynamics*, New York: Hemisphere, 1979.
4. Howell, J.: *Fundamentals of Engineering Thermodynamics*, McGraw-Hill, 1992.
5. Baehr H. D.: Kabelac S.: *Thermodynamik*, Berlin, Springer, 2006.

## Contents of lectures (syllabus)

	Topics	Time (hrs.)	Scope (S / Ex)
1	Basic Concepts and Definitions	2	S
2	The First Law of Thermodynamics	2	S
3	The Ideal Gas, Corresponding States	2	S
4	Control Volume Energy Analysis	4	S
5	The Second Law and Entropy	2	S
6	Gas Power Cycles	4	S
7	Reacting Mixtures and Combustion,	2	S
8	Steam As the Working Fluid	2	S
9	Vapour Power Systems	4	S
10	Nonreactive Ideal-Gas Mixtures	2	S
11	Moist Air Processes, Psychrometric Chart	4	S
<b>Total</b>		<b>30</b>	<b>hours</b>

S – topics listed in the legal study programme standards from 12.07.2007

Ex – extended topics

### Lecturers

dr inż. Piotr Narowski

### Assessment method

Examination

## Contents of tutorials

	Topics	Time (hrs.)	Scope (S / Ex)
1	Basic Concepts and Definitions	1	S
2	The First Law of Thermodynamics	1	S
3	The Ideal Gas, Corresponding States	1	S
4	Control Volume Energy Analysis	2	S
5	The Second Law and Entropy	1	S
6	Gas Power Cycles	2	S
7	Reacting Mixtures and Combustion,	1	S
8	Steam As the Working Fluid	1	S
9	Vapour Power Systems	2	S
10	Nonreactive Ideal-Gas Mixtures	1	S
11	Moist Air Processes, Psychrometric Chart	2	S
<b>Total</b>		<b>15</b>	<b>hours</b>

S – topics listed in the legal study programme standards from 12.07.2007

Ex – extended topics

### Persons responsible for tutorials

dr inż. Piotr Narowski

### Assessment method for tutorials

Tutorial class tests with problems solving