Faculty of Civil Engineering and Environmental Engineering				
Study programme:	**Environmental Engineering**	Degree level: 2nd full-time programme:	**Master's degree**	
Specialization	**Advanced Technologies in Environmental Engineering**	Diploma path:	**-**	
Module name:	**Air protection**			
Module type:	**obligatory**	Semester: **I**	ECTS **4**	Module ID: **EE1103**
No. of hrs in semester:	L - **15** C - **-** LC- **-** P- **30** SW- **-** S- **-**			
Prerequisites:	*Complete with prerequisites or "-"*	**-**		
Teaching methods:	*lecture, project*	*Assessment:*	*Evaluation must be relevant to the intended learning outcomes*	
		lecture - written exam and/or oral exam, tests; project - completion, presentation and discussion of the project, verification of preparation for classes		
Aims and objectives:	*Mastering the skills and competence to understand phenomena and processes occurring in the atmosphere; principles of operation, designing and use of equipment and technologies protecting the quality of ambient air*			
Module content:	*1) Basic terms in air protection and ambient air pollution.* *2) Influence of meteorological phenomena on pollution dispersion.* *3) Identification and determination of the concentration of gas pollutions and dust fall in the context of permissible levels. Legal regulations on air protection.* *4) Methods, technologies and equipment for retention of dust and gas pollutions arising in pollution sources.* *5) Technologies for emission control: sulphur dioxides, nitrogen oxides, carbon oxide, gaseous organic compounds, polycyclic aromatic hydrocarbons, furans, dioxins.*			

Learning outcomes	*Write min. 4, max. 8 learning outcomes in the following order: knowledge - skills - competences. Each learning outcome must be verifiable.*	*Relevance to the programme learning outcomes*
LO1	Is able to describe basic processes associated with waste gas treatment	K_W04
LO2	is able to design, explain the principle of operation the basic equipment for the purification of gases	K_W14, K_U20
LO3	is able to suggest ways of purifying gases from subject literature	K_W08, K_U01, K_U08
LO4	Is aware of the non-technical aspects and environmental impacts associated with the engineering activities	K_K02
LO5	-	
LO6	-	
LO7	-	
LO8	-	

student workload	lecture attendance	15x1h	15
	participation in project classes	15x2h	30
	preparation to project classes	15x1h	15
	implementation of project tasks	5x2h	10
	completion, presentation and discussion of the project		15
	preparation for and participation in exam		15
		TOTAL:	100
quantitative indicators	Student workload - activities that require direct teacher participation 15h+30h+15+1+5=66h	66	ECTS
			2,2
	Student workload - practical skills activities 30h+15h+10h+15h+15h	85	2,8
basic references:	*1) Mirosław Szklarczyk ;"Ochrona atmosfery". Wydaw. Uniw. Warmińsko-Mazurskiego, Olsztyn , 2001* *2). J.Warych, "Oczyszczanie przemysłowych gazów odlotowych" PWN, Warszawa, 2000r.* *3). J. Warych, Aparatura chemiczna i procesowa, OWPW, Warszawa, 2004* *4) Konieczyński J. "Ochrona powietrza przed szkodliwymi gazami : metody, aparatura i instalacje" Wydaw. Politechniki*		
supplementary references:	*1) Louis Theodore, "Air Pollution Control Equipment Calculations" John Wiley & Sons 2008* *2) F. M. Dunnivant, "A Basic Introduction to Pollutant Fate and Transport…", John Wiley & Sons 2006* *3) D. Vallero,"Fundamentals of Air Pollution", Fourth Edition, Academic Press 2007*		

learning outcomes	*methods of assessing learning outcomes*	type of class (if more than one) where the outcomes are assessed
LO1	evaluating the student's exam on lecture content, preparation and discussion of the student's project	L,P
LO2	evaluating the student's exam on lecture content, preparation and discussion of the student's project	L,P
LO3	evaluating the student's exam on lecture content, preparation and discussion of the student's project	L,P
LO4	discussion of the student's project	P
LO5		
LO6		
LO7	-	
LO8	-	

Department:	Department of Environmental Engineering Systems	Group instructors:	Msc Tomasz Kiełbasa, PhD Eng. Krzysztof Nytko
Date:	10.01.2013	Coordinator:	Msc Tomasz Kiełbasa