

<b>Environmental Chemistry</b>								<b>Code of the course</b>	<b>Year / Semester</b>	
<b>Type of subject:</b>								<b>Education Profile</b>	<b>The level of education</b>	<b>Form of studies</b>
<b>Obligatory</b>								<b>General Academic</b>	<b>Stationary</b>	
<b>Type of subject</b>								<b>ECTS</b>		
<b>Lecture</b>	<b>Exercises</b>	<b>Laboratory</b>	<b>Project</b>	<b>Seminar</b>	<b>Practical classes</b>	<b>Exam</b>				
<b>15</b>	<b>-</b>	<b>15</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>-</b>	<b>5</b>			
<b>Subject coordinator:</b>										
<i>Dr Beata Karwowska, beata.karwowska@pcz.pl</i>										

<b>II. COURSE CONTENT</b>		
<b>Course type – Lecture</b>		<b>Number of hours</b>
<b>1</b>	Course organization, assignment rules	1
<b>2</b>	Geoecosystems characterization	1
<b>3</b>	Chemical reactions in the atmosphere: formation and decomposition of stratospheric ozone	1
<b>4</b>	Chemical reactions in the atmosphere: formation of smog	1
<b>5</b>	Chemical reactions in the atmosphere: acid rains	1
<b>6</b>	Earth energy balance: greenhouse effect	1
<b>7</b>	Water in environment	1
<b>8</b>	Basic parameters of natural water	1
<b>9</b>	Nutrient elements in natural waters – eutrophication	1
<b>10-11</b>	Structure, characteristics and role of soil	2

12	Geochemical cycles of selected chemical elements	1
13	Inorganic and organic pollutants in environment	1
14	Chemical pollution in environment – self-treatment processes and chemical treatment methods	1
15	Assignment	1
<b>TOTAL:</b>		<b>15</b>
<b>Course type - Exercises</b>		<b>Number of hours</b>
1	Introduction to the course, workplan presentation, rules of assignment	1
2	Gaseous state, ideal gas law	1
3	Mixtures of gases, Dalton law of partial pressures	1
4	Atmospheric chemistry – atmospheric ozone	1
5	Atmospheric chemistry – principal and trace elements in the atmosphere	1
6	Solubility of simple gases in water, Henry's law	1
7-8	Gases reacting with water	2
9	Water chemistry: hardness, alkalinity, pH of water	1
10	Hydrosphere chemistry: carbonate equilibria	1
11-12	Dissolved oxygen in water	2
13	Chemistry of soil, components of soil	1
14	Nutrient substances in soil	1
15	Assignment	1
<b>TOTAL:</b>		<b>15</b>

#### **DIDACTIC METHODS**

1.	Blackboard, interactive whiteboard, e-learning platform
2.	Multimedia presentation
3.	Sets of problems for solving during classes and for individual solution
4.	Physico – chemical tables, periodic table of elements

#### **METHODS OF ASSESSMENTS: (F – FORMATIVE; S – SUMMATIVE)**

<b>F01</b>	Activity in classes
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<b>S01</b>	Test
<b>S02</b>	Tasks during tutorials

<b>III. STUDENT WORKLOAD</b>		
<b>L.p.</b>	<b>Form of activity</b>	<b>Numer of hours for activity</b>
		<b>[hours]</b>
<b>1. Direct teaching hours:</b>		
<b>1.1</b>	Hours of classes organized by universities – lectures	15
<b>1.2</b>	Hours of classes organized by universities – exercises	15
<b>1.3</b>	Hours of classes organized by universities – laboratory	
<b>1.4</b>	Hours of classes organized by universities – project	
<b>1.5</b>	Hours of classes organized by universities – field activities	
<b>1.6</b>	Hours of classes organized by universities – seminar	
<b>1.7</b>	Exam	
<b>Total direct hours:</b>		<b>30</b>
<b>2. Student's own work</b>		
<b>2.1</b>	Preparation for exercises and for final exams	60
<b>2.2</b>	Preparation for laboratory test reports, preparation of individual	
<b>2.3</b>	Preparing your own project	
<b>2.4</b>	Preparation for the final exam from the lecture	25
<b>2.5</b>	Exam Preparation	
<b>2.6</b>	Reading the literature	
<b>Total student's self-studies:</b>		<b>95</b>
<b>Overall student workload:</b>		<b>125</b>
<b>TOTAL NUMBER OF ECTS FOR THE COURSE:</b>		<b>5</b>
The number of ECTS credits that a student obtains in classes requiring the direct participation of the teacher:		<b>1,2</b>
The number of ECTS credits that the student obtains as part of his/her own work		<b>3,8</b>

<b>IV. PRIMARY AND SUPPLEMENTARY LITERATURE</b>
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<b>Primary literature</b>	
1	vanLoon G.W., Duffy S.J., Environmental Chemistry. Global perspective, Oxford University Press, Oxford, UK, 2010
2	O'Neil P., Environmental Chemistry, CRC Press, UK, 1998
3	Manahan S.E., Environmental Chemistry, CRC Press, UK, 2009
4	Silberberg M.S., Principles of General Chemistry, McGraw Hill International Edition, New York, USA 2007
5	Tchobanoglous G., Burton F., Stensel H.D., Wastewater Engineering Treatment and Reuse, Metcalf&Eddy, Inc, 2004
6	Gray N.F., Water Technology an Introduction for Environmental Scientists and Engineers, Elsevier, 2005
7	Evangelou V.P., Environmental Soil and Water Chemistry, Principles and Applications, A Wiley& Sons, Inc, 1998
<b>Supplementary literature</b>	

<b>VII. OTHER USEFUL INFORMATION ABOUT THE SUBJECT</b>	
1.	Opportunity to review supporting materials and literature: <i>Appropriate to the type of material - in teaching classes, in the TUC Central Library.</i>
2.	Information on when and where the classes will be held <i>Notice board at the Faculty of Infrastructure and Environment and on the website of the Faculty of Infrastructure and Environment, MSz USOS system.</i>
3.	Information about the consultation (times + place): <i>the staff consultation schedule is available on the Faculty of Infrastructure and Environment website and on the staff room door.</i>