Name od module/subject	Code
Environmental monitoring	

COURSE DESCRIPTION CARD

Field of study	Training profile (general academic/practical)	Year / Semester
Environmental engineering	**practical**	**II/4**
Specialization	Subject offered in: **English**	Course (obligatory/optional) **obligatory**
No. of lecture hours: 30 No. of laboratory hours: 30		ECTS **3**

Cycle of studies:	**Form of studies**	**Field of studies**
first	(full time/weekends) Full time	Technical sciences

Status of subject in curriculum (basic, specialized, other) (general academic, from other department)

Specialized sciences **general academic**

Unit providing the training: **Institute of Environmental Engineering and Protection**

Lecturer in charge of the subject:

Prof. Jerzy Siepak
dr Sławomir Binkowski

Initial requirements in knowledge, skills, social competences:

1	**Knowledge:**	Student has ordered knowledge of inorganic, organic, physical and analytical chemistry; knows the mathematical tools used in chemical calculations
2	**Skills:**	Student uses the basic laboratory techniques in the separation and purification of chemical compounds
3	**Social competences**	He is aware of the need to broaden his competences and readiness to cooperate within the team

The aim of the subject:
Obtaining knowledge in the field of organization and techniques used in environmental monitoring. Mastering the basics of instrumental methods, their use in qualitative and quantitative analysis as well as physicochemical characterization of a substance. Gaining knowledge about the apparatus used in monitoring methods and environmental control. Mastering legal acts regarding environmental monitoring.

Training outcomes

Knowledge As a result of the training course a student is able to:		Reference to field-related training outcomes
1	have knowledge of techniques and methods of environmental monitoring and control	**K_W03**
2	know the methods, techniques, tools and materials used to solve simple problems related to the control of the environment	**K_W04**

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Skills As a result of the training course a student is able to:		Reference to field-related training outcomes
1	determine the usefulness and choose tools (methods) to solve the problem of environmental control	**K_U08** **K_U15**
2	compare the monitoring data with the applicable legal acts	**K_U01**
Competences As a result of the training course a student is able to:		Reference to field-related training outcomes
1	Understand the need for permanent education and communication in a comprehensible way of information with the immediate environment in the professional activity	**K_K01**
2	Understand the ecological effects of his action and its impact on the environment	**K_K02**

Accepted grading criteria

Local grade	**Local definition**	**ECTS grade**	**ECTS definition**
5	Bardzo dobry [very good]– perfect knowledge, skills, competences	A	Celujący [exemplary] – extraordinary achievements
4,5	Dobry plus [good plus]– very good knowledge, skills, competences	B	Bardzo dobry [very good] – above average standards with some mistakes
4	Dobry [good] – good knowledge, skills, competences	C	Dobry [good[– general good work with some noticeable mistakes
3,5	Dostateczny plus [satisfactory plus] – satisfactory knowledge, skills, competences but with significant shortcomings	D	Zadowalający [satisfactory] – satisfactory but with significant mistakes
3	Dostateczny [satisfactory] – satisfactory knowledge, skills, competences but with numerous shortcomings (threshold 60% of the requirements)	E	Dostateczny [satisfactory] – outcomes meet minimal criteria
2	Niedostateczny [insufficient] – insufficient knowledge, skills and competences (below 60% of the requirements)	FX, F	Niedostateczny [insufficient] – basic shortcomings in material

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Assumed grading methods
Diagnosing assessment: Current control during laboratory classes. **Summative assessment:** Final written exam

Curriculum content
As part of the course, the following are discussed: principles of organization of environmental monitoring, measurement system, selected research methods. Techniques for controlling pollution of the atmosphere, waters, soils and biological materials. The basics of instrumental methods in the analysis of pollution of the natural environment of man. Acquainting with the basics of spectrophotometric, electrochemical and speciation methods, including chromatographic techniques. Discussion of parameters characterizing the environment: water, air and soil. Including new trends in the monitoring analysis combined with speciation analysis and combined techniques.

Supplementary bibliography:
Current legal regulation regarding monitoring

Student's involvement

Form of activity	Hours	ECTS
Total number of hours	120	3
Hours requiring direct contact with a lecturer	60	2
Activities requiring self-studying	30	1