UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

of Environmental Sciences

A list of syllabus subjects

Field of study

Environmental Engineering

Speciality area

Level of study

Programm code

4907-SMU-PEEPB_PRK

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Wydział Nauk o Środowisku

Course / module syllabus - part A

ANALYTICAL TRAINING

ECTS: 2
YEAR: 2018L

COURSE CONTENT
CLASSES:

Determination of selected chemical indicators in water and wastewater. Determination of metal concentration in samples soil by flame atomic absorption spectrometry (FAAS). Determination of selected concentrations PAHs in liquid and solid samples using techniques for the extraction of solid phase samples and high performance liquid chromatography (HPLC). Determination of selected properties of surfactants using tensiometer.

LECTURES:

brak

EDUCATIONAL OBJECTIVE:

DESCRIPTION OF LEARNING OUTCOMES FOR THE COURSE IN REALATION TO FIELD AND MAJOR LEARNING OUTCOMES

Codes of learning outcomes in a major field of study:	T2A_K02+, T2A_K03+, T2A_K04+, T2A_K06+, T2A_U07+, T2A_U12+, T2A_U19+, T2A_W01+,
Codes of learning outcomes in a major area of study:	K2_K01+, K2_U05+, K2_U12+, K2_W02+,

LEARNING OUTCOMES:

Knowledge

W1 - Students have knowledge of the principles of determining chemical indicators in samples environmental (water, sewage, soil) and sample preparation for analysis

Skills

U1 - Students are able to perform chemical analyzes of environmental samples, calculate the values of indicators and express them in appropriate units
U2 - Students will acquire the ability to use laboratory equipment spectrophotometer, microwave oven,atomic absorption spectrometer, liquid chromatograph, tensiometer)

Social competence

K1 - Students are able to interact and work in a group, are aware of the importance of analytical methods in monitoring the quality of the environment, set priorities for achieving objectives

BASIC LITERATURE

1) Bułkowska K.,Kulikowska D., Gusiatin Z.M,, Analitycal training. Laboratory handbook, wyd. Katedra Biotechnologii w Ochronie Środowiska, 2016 ; 2) American Public Health Association (APHA), Standard Methods for the Examination of Water and Wastewater, 18th ed, wyd. American Public Health Association, Washington, , 1992

SUPPLEMENTARY LITERATURE

1)) S. Hooda, Trace Elements in Soils, wyd. Wiley-Blackwell, 2010

Course / module
Analytical training
Fields of education:
Obszar nauk technicznych

Course status:	facultative
Course group:	brak
ECTS code:	
Field of study:	Environmental Engineering
Specialty area:	
Educational profile:	General academic
Form of study:	Stacjonarne
Level of study:	Drugiego stopnia/ masters
Year/Semester:	1 / 1

Type of course:
Laboratory classes

Number of hours per semester/week:	Laboratory classes: 30

Teaching forms and methods
Laboratory classes(K1, U1, U2, W1) :
Form and terms of the verification results:
LABORATORY CLASSES: Report - null(K1, U1, U2, W1) ;LABORATORY CLASSES: Competention test - null(K1, W1)

Number of ECTS points:	2
Language of instruction	polski

Introductory courses:
Preliminary requirements:

Name of the organizational unit offering the course:
Katedra Biotechnologii w Ochronie Środowiska,
Person in charge of the course:
dr hab. inż. Zygmunt Gusiatin,
Course coordinators:

Notes:
work in groups of 2-3 people

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

Detailed description of the awarded ECTS points - part B

ECTS:2
YEAR: 2018L

ANALYTICAL TRAINING

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: laboratory classes	30 h
- consultation	2 h
	32 h

2. Student's independent work:

	0 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 32 h : 1 h/ECTS = 32,00 ECTS
average: **2 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	32,00 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	-30,00 ECTS points,

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Wydział Nauk o Środowisku

Course / module syllabus - part A

ECTS: 3,5
YEAR: 2018L

BIOLOGICAL WASTEWATER TREATMENT
BIOLOGICAL WASTEWATER TREATMENT

COURSE CONTENT
CLASSES:

Typical wastewater treatment plant configuration. Technological parameters of biological stage of wastewater treatment. Designing the activated sludge system for carbon removal processes with nitrification. Interaction between biological reactors and final clarifiers. Designing step –feed denitrification process. The technological and technical parameter pre-anoxic zone denitrification. Denitrification with external organic carbon. The technological and technical parameters for biological phosphorus removal systems. Chemical methods for phosphorus removal from wastewater

LECTURES:

Wastewater characteristics. Technical and microbial aspects of activated sludge process. Single, two and three stage activated sludge processes. Removal of organic carbon by activated sludge. Nitrification. Denitrification. Technological systems for nitrogen removal. The single reactor system for nitrogen removal . Mechanism of biological phosphorus removal. Technological system for phosphorus removal. Co-removal of emerging contaminants. Membrane Bioreactors.

EDUCATIONAL OBJECTIVE:

DESCRIPTION OF LEARNING OUTCOMES FOR THE COURSE IN REALATION TO FIELD AND MAJOR LEARNING OUTCOMES

Codes of learning outcomes in a major field of study:	T2A_K02++, T2A_K03++, T2A_K04++, T2A_K06++, T2A_U09+, T2A_U10+, T2A_U11+, T2A_U16+, T2A_U18+, T2A_U19+, T2A_W01+, T2A_W02+, T2A_W03+,
Codes of learning outcomes in a major area of study:	K2_K01++, K2_U07+, K2_U15+, K2_W03+, K2_W06+, K2_W09+,

LEARNING OUTCOMES:

Knowledge

W1 - The student will: know the typical configuration of the wastwewater treatment. Understanding the principle of the biological methods of wastewater treatment. Familiar with biological processes like nitrification and denitrification. Know the rules of nitrification, denitrification processes
W2 - Become familiar with the biological and chemical methods for phosporus removal. Knows the biological and chemical process for phoshorus removal
W3 - Understand the principle of the co-removal process of the emeriging contamination

Skills

U1 - The student will be able to choose proper solution of the biological system for wastewater treatment. Know how to design 1th , 2th, 3th stages of the activated sludge system; be able to design a nitrogen removal activated sludge system
U2 - The student will be able to design a phosphorus removal activated sludge system and chemical step for polishing the wastewater

Social competence

K1 - Understand the meaning of the biological principle for technical solutions
K2 - Knows how the importance of the link between biological and technical aspects in the case of new micropollutants in wastewate

BASIC LITERATURE

1) H.J Jordning, J Winter Wiley-Vch, Environmental Biotechnology, wyd. Amazon, 2005 ; 2) Edit by: P. Aarne Vesilind et all, Wastewater treatment plant design, wyd. IWA Publishing, 2003 ; 3) McGraw-Hill, , Engineering (Treatment, Disposal, Reuse) , wyd. International Editions, 1991

SUPPLEMENTARY LITERATURE

Course / module
Biological wastewater treatment
Fields of education:
Obszar nauk technicznych

Course status:	facultative
Course group:	brak
ECTS code:	
Field of study:	Environmental Engineering
Specialty area:	
Educational profile:	General academic
Form of study:	Stacjonarne
Level of study:	Drugiego stopnia/ masters
Year/Semester:	1 / 1

Type of course:
Lecture, Auditorium classes

Number of hours per semester/week:	Lecture: 10, Auditorium classes: 20

Teaching forms and methods
Lecture(K1, K2, W1, W2, W3) : , Auditorium classes(U1, U2) :

Form and terms of the verification results:
LECTURE: Written exam - null(K1, K2, W1, W2, W3) ;AUDITORIUM CLASSES: Written test - null(U1, U2, W3)

Number of ECTS points:	3,5
Language of instruction	angielski

Introductory courses:

Preliminary requirements:

Name of the organizational unit offering the course:
Katedra Biotechnologii w Ochronie Środowiska,

Person in charge of the course:
prof. dr hab. inż. Irena Wojnowska-Baryła,

Course coordinators:

Notes:
brak

ECTS code: AAABB-CD-E_F

AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

Detailed description of the awarded ECTS points - part B

ECTS:3,5
YEAR: 2018L

BIOLOGICAL WASTEWATER TREATMENT
BIOLOGICAL WASTEWATER TREATMENT

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: auditorium classes	20 h
- participation in: lecture	10 h
- consultation	4 h
	34 h

2. Student's independent work:

	0 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 34 h : 1 h/ECTS = 34,00 ECTS

average: **3,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	34,00 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	-30,50 ECTS points,

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Wydział Nauk o Środowisku

Course / module syllabus - part A

ECTS: 3,5
YEAR: 2018L

BIOTECHNOLOGY IN ENVIRONMENTAL PROTECTION
BIOTECHNOLOGY IN ENVIRONMENTAL PROTECTION

Course / module
Biotechnology in environmental protection

Fields of education:
Obszar nauk technicznych

Course status: facultative
Course group: brak
ECTS code:
Field of study: Environmental Engineering
Specialty area:
Educational profile: General academic
Form of study: Stacjonarne
Level of study: Drugiego stopnia/ masters
Year/Semester: 1 / 1

Type of course:
Laboratory classes, Lecture

Number of hours per semester/week: Laboratory classes: 34, Lecture: 11

Teaching forms and methods
Laboratory classes(K1, U1, U2, U3) : , Lecture(K2, W1, W2) :

Form and terms of the verification results:
LABORATORY CLASSES: Write-up - null(K1, U1, U2, U3) ;LECTURE: Written exam - null(K2, W1, W2)

Number of ECTS points: 3,5
Language of instruction angielski
Introductory courses:
Preliminary requirements:

Name of the organizational unit offering the course:
Katedra Biotechnologii w Ochronie Środowiska,

Person in charge of the course:
dr hab. inż. Tomasz Pokój,

Course coordinators:

Notes:
brak

COURSE CONTENT
CLASSES:

The effect of carbon to nitrogen ratio (C/N) in the culture medium on the efficiency of PHAs accumulation in activated sludge. The use of biosurfactants of plant and microbial origin for heavy metals removal from soils. The effect of operational conditions for removal on PAHs from soils using biosurfactants.

LECTURES:

Technological strategies for biodegradable polymers – production of polyhydroxyalkanoates (PHAs) using pure and mixed microbial cultures. Techniques of remediation and bioremediation of soils contaminated with heavy metals and polycyclic aromatic hydrocarbons (PAHs). Types and properties of biosurfactants used in soil bioremediation. The use of biosorption for removing dyes from wasterwater

EDUCATIONAL OBJECTIVE:

DESCRIPTION OF LEARNING OUTCOMES FOR THE COURSE IN REALATION TO FIELD AND MAJOR LEARNING OUTCOMES

Codes of learning outcomes in a major field of study:	T2A_K01+, T2A_K02+, T2A_K03+, T2A_K04+, T2A_K06+, T2A_U04+, T2A_U07+, T2A_U09+, T2A_U10+, T2A_W01+, T2A_W02+,
Codes of learning outcomes in a major area of study:	K2_K01+, K2_K03+, K2_U05+, K2_U07+, K2_U13+, K2_W03+, K2_W04+,

LEARNING OUTCOMES:

Knowledge

W1 - A student will have knowledge of the application of technological strategies compatible with the concept of sustainable development, e.i. production of biodegradable polymers as packaging materials. He will describe methods of remediation and bioremediation that are used for a treatment of chemically degraded soils
W2 - He will have knowledge of the sorbents and biosorbents used for wastewater treatment

Skills

U1 - A student will be able to perform bath culture of activated sludge for polyhydroxyalkanoates production. He will be able to determine kinetics constants and the rates of substrate consumption and PHA accumulation as well as PHA yield coefficient and volumetric productivity
U2 - The student will be able to conduct a washing process for soils contaminated with heavy metals using biosurfactants in batch experiments. He will be able to determine kinetics constants and the efficiency of metal removal. The student will be able to detrmine the efficiency of PAHs removal from soils using biosurfactants in ifferent operational conditions
U3 - He will also be able to determine the degree of biosurfactants sorption onto soil. He will be able to determine the adsorption capacity of biosorbents and evaluate their efficiency of dye removal from aqueous solutions. He will be able to fit adsorption isotherm models and determine adsorption censtants

Social competence

K1 - A student will be able to cowork in a group
K2 - He will understand the importance of biotechnology methods in protection and restoration of the environmen

BASIC LITERATURE

1) Chen G.Q., Plastics from Bacteria. Natural Functions and Applications., wyd. Springer-Verlag, Berlin Heidelberg, Germany, 2010 ; 2) Khan F.I., Husain T., Hejazi R., An overview and analysis of site remediation technologies, wyd. Journal of Environmental Management, 2004, t. 71, s. 95-122; 3) Mulligan C.N., Environmental applications for biosurfactants, wyd. Environmental Pollution, 2005, t. 133, s. 183-198; 4) Gupta V.K., Suhas., Application of low-biosorbents for dye removal – a review, wyd. Journal of Environmental Management, 2009, t. 90, s. 2313–2342

SUPPLEMENTARY LITERATURE

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

Detailed description of the awarded ECTS points - part B

ECTS:3,5
YEAR: 2018L

BIOTECHNOLOGY IN ENVIRONMENTAL PROTECTION
BIOTECHNOLOGY IN ENVIRONMENTAL PROTECTION

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: laboratory classes	34 h
- participation in: lecture	11 h
- consultation	4 h
	49 h

2. Student's independent work:

	0 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 49 h : 1 h/ECTS = 49,00 ECTS
average: **3,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	49,00 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	-45,50 ECTS points,

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Wydział Nauk o Środowisku

Course / module syllabus - part A

ECTS: 2
YEAR: 2018L

DESIGN OF PROCESSES IN ENVIRONMENTAL BIOTECHNOLOGY
DESIGN OF PROCESSES IN ENVIRONMENTAL BIOTECHNOLOGY

COURSE CONTENT
CLASSES:

Design of composting dewatered sewage sludge with lignocellulosic materials as amendments. Technological concept of biodiesel production in continuous flow high pressure system. Production of agricultural biogas – technological concept. Technological calculations for biogas production from agricultural and food industry wastewater. Calculations of process requirements for bioremediation of soils contaminated with petroleum in biopile system

LECTURES:

brak

EDUCATIONAL OBJECTIVE:

DESCRIPTION OF LEARNING OUTCOMES FOR THE COURSE IN REALATION TO FIELD AND MAJOR LEARNING OUTCOMES

Codes of learning outcomes in a major field of study:	T2A_K02+, T2A_K03+, T2A_K04+, T2A_K06+, T2A_U09+, T2A_U10+, T2A_W02+,
Codes of learning outcomes in a major area of study:	K2_K01+, K2_U07+, K2_W04+,

LEARNING OUTCOMES:

Knowledge

W1 - Students will be able to describe the technologies for sewage sludge composting. Students will be able to describe methods for biodiesel production. They will have knowledge of the anarobic digestion of wastewater. They will be able to describe the system for agricultural biogas production. They will have knowledge of soil bioremediation and factors affecting the process efficiency

Skills

U1 - Student will be able to calculate the amount of sewage sludge in WWTP and individual components in composting feedstock (sewage sludge, lignocellulosic materials). Student will be able to develop the technological concept for production of various types of biofuels. They will be able to calculate the size of equipment in the technological systems for biogas production. They will be able to calculate bioremediation requirements for treatment of soils contaminated with petroleum, depending on contamination level

Social competence

K1 - Students will gain experience on understanding the relationships between proper design of biotechnological processes and quality of the environment. Students will be aware of the importance of biotechnological methods in protection and restoration of the environment

BASIC LITERATURE

1) Deublein D., Steinhauser A., Biogas from Waste and Renewable Resources, wyd. Wiley-VCH verlag GmgH & Co. KGaA, Weinheim, 2011 ; 2) Zhang Y., Dubé M.A., McLean D.D., Kates M. , Process design and technological assessment, wyd. Bioresource Technology, 2003, t. 89(1), s. 1-16; 3) Crawford R.L., Crawford D.L., Bioremediation – principles and applications, wyd. Cambridge University Press, 1996

SUPPLEMENTARY LITERATURE

Course / module
Design of processes in environmental biotechnology

Fields of education:
Obszar nauk technicznych

Course status:	facultative
Course group:	brak
ECTS code:	
Field of study:	Environmental Engineering
Specialty area:	
Educational profile:	General academic
Form of study:	Stacjonarne
Level of study:	Drugiego stopnia/ masters
Year/Semester:	1 / 1

Type of course:
Project classes

Number of hours per semester/week:	Project classes: 30

Teaching forms and methods
Project classes(K1, U1, W1) :

Form and terms of the verification results:
PROJECT CLASSES: Project - null(K1, U1, W1)

Number of ECTS points:	2
Language of instruction	angielski

Introductory courses:

Preliminary requirements:

Name of the organizational unit offering the course:
Katedra Biotechnologii w Ochronie Środowiska,

Person in charge of the course:
dr inż. Katarzyna Bułkowska,

Course coordinators:

Notes:
brak

ECTS code: AAABB-CD-E_F

AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

Detailed description of the awarded ECTS points - part B

ECTS:2
YEAR: 2018L

DESIGN OF PROCESSES IN ENVIRONMENTAL BIOTECHNOLOGY
DESIGN OF PROCESSES IN ENVIRONMENTAL BIOTECHNOLOGY

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: project classes	30 h
- consultation	2 h
	32 h

2. Student's independent work:

0 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 32 h : 1 h/ECTS = 32,00 ECTS
average: **2 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	32,00 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	-30,00 ECTS points,

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Wydział Nauk o Środowisku

Course / module syllabus - part A

ENGLISH TERMINOLOGY IN BIOTECHNOLOGY

ECTS: 1,5
YEAR: 2018L

COURSE CONTENT
CLASSES:

Chemistry as the study of matter; the states and organisation of matter. Classification of matter; what is matter made of? Sewage treatment; inside the atom. Pre-treatment of municipal solid waste. Nucleic acids. Genes and chromosomes. DNA replication; mitosis, meiosis, gametogenesis. Biotechnology in aquaculture, molecular cloning. Microbiology; microbial diversity. Sewage and waste water microbiology. Activated sludge process. Demonic males; apes and the origins of human violence. Microbial plastics. Nitrogen removal from water and waste. The role of microRNA in microcystin induced toxicity in fish.

LECTURES:

brak

EDUCATIONAL OBJECTIVE:

DESCRIPTION OF LEARNING OUTCOMES FOR THE COURSE IN REALATION TO FIELD AND MAJOR LEARNING OUTCOMES

Codes of learning outcomes in a major field of study:	T2A_K02+, T2A_K03+, T2A_K04+, T2A_K06+, T2A_U01+, T2A_U10+, T2A_W01+,
Codes of learning outcomes in a major area of study:	K2_K01+, K2_U01+, K2_W01+,

LEARNING OUTCOMES:

Knowledge

W1 - Knowledge of English subjects related to the field of undergraduate and a more detailed knowledge of issues related to the speciality number of Master

Skills

U1 - Mastering English-language vocabulary on the topic of the lectures

Social competence

K1 - Improving the practical use of research of scientific literature in learning the English language in scientific discussion

BASIC LITERATURE

1) Łuczyński M. , English Terminology in Biotechnology. Bilingual (in English with English-Polish dictionary for each topic) materials for internal use at the Department of Environmental Biotechnology, wyd. Skryp autorski, 2016

SUPPLEMENTARY LITERATURE

Course / module
English terminology in biotechnology
Fields of education:
Obszar nauk technicznych

Course status:	facultative
Course group:	brak
ECTS code:	
Field of study:	Environmental Engineering
Specialty area:	
Educational profile:	General academic
Form of study:	Stacjonarne
Level of study:	Drugiego stopnia/ masters
Year/Semester:	1 / 1

Type of course:
Auditorium classes

Number of hours per semester/week:	Auditorium classes: 30

Teaching forms and methods
Auditorium classes(K1, U1, W1) :
Form and terms of the verification results:
AUDITORIUM CLASSES: Colloquium test - null(K1, U1, W1)

Number of ECTS points:	1,5
Language of instruction	angielski

Introductory courses:
Preliminary requirements:

Name of the organizational unit offering the course:
Katedra Biotechnologii w Ochronie Środowiska,
Person in charge of the course:
prof. dr hab. inż. Irena Wojnowska-Baryła,
Course coordinators:

Notes:
brak

ECTS code: AAABB-CD-E_F — AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

Detailed description of the awarded ECTS points - part B

ECTS:1,5
YEAR: 2018L

ENGLISH TERMINOLOGY IN BIOTECHNOLOGY

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: auditorium classes	30 h
- consultation	2 h
	32 h

2. Student's independent work:

0 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 32 h : 1 h/ECTS = 32,00 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	32,00 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	-30,50 ECTS points,

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Wydział Nauk o Środowisku

Course / module syllabus - part A

ENGLISH/POLISH LANGUAGE SUPPORT

09149-25-C
ECTS: 1,5
YEAR: 2018L

COURSE CONTENT
CLASSES:

Treści nauczania zgodne z programem nauczania języka angielskiego dla I semestru poziomu B2+, zgodnie z tabelą wymagań Europejskiego Systemu Opisu Kształcenia Językowego (ESOKJ), w cyklu 1 x 30 h = 30 h; analiza i praca z tekstami specjalistycznymi w języku angielskim z zakresu gospodarki wodno-ściekowej, gospodarki odpadami, ekologicznej infrastruktury energetycznej, zarządzania zasobami i przeciwdziałania zagrożeniom środowiska, dostosowania firm i technologii do wymogów środowiskowych; tłumaczenie tekstów i artykułów z dziedziny inżynierii środowiska z języka polskiego na język angielskii i z języka angielskiego na język polski

LECTURES:

brak

EDUCATIONAL OBJECTIVE:

Developing language competences that allow students to understand, translate and use English specialist linguistics in the field of environmental engineering

DESCRIPTION OF LEARNING OUTCOMES FOR THE COURSE IN REALATION TO FIELD AND MAJOR LEARNING OUTCOMES

Codes of learning outcomes in a major field of study:	T2A_K01+, T2A_U03+, T2A_U04+, T2A_U06++, T2A_W05+,
Codes of learning outcomes in a major area of study:	K2_K03+, K2_U04+, K2_U16+, K2_W17+,

LEARNING OUTCOMES:

Knowledge

W1 - The student has the knowledge necessary to understand and formulate statements in English, containing specialist vocabulary in the field of a given field of study, according to the table of requirements for the B2 + CEFR level and in proportion to the number of hours planned.

Skills

U1 - The student uses specialist terminology in the field of study, in proportion to the number of hours planned
U2 - The student reads with understanding and critically analyzes texts containing specialized lexicon in the field of study

Social competence

K1 - The student understands the importance of foreign language skills, including English as one of the conference languages; appreciates the importance of foreign language skills as an element allowing for a better position in the conditions of growing competition on the labor market.

BASIC LITERATURE

1) Richard Lee, English for Environmental Science, wyd. Garnet Education, 2009 ; 2) Keith Kelly, Science, wyd. Macmillan, 2008 ; 3) Keith Kelly, Geography, wyd. Macmillan, 2009

SUPPLEMENTARY LITERATURE

Course / module
English/Polish language support

Fields of education:
Obszar nauk technicznych

Course status:	facultative
Course group:	brak
ECTS code:	09149-25-C
Field of study:	Environmental Engineering
Specialty area:	
Educational profile:	General academic
Form of study:	Stacjonarne
Level of study:	Drugiego stopnia/ masters
Year/Semester:	1 / 1

Type of course:
Classes

Number of hours per semester/week: Classes: 30

Teaching forms and methods

Classes(K1, U1, U2, W1) : Communicative method with elements of the grammatical-translation method

Form and terms of the verification results:

CLASSES: Evaluation of the work and cooperation in the group - The student is assessed on a scale of 2-5 for activity, creativity and correctness of tasks in the group.(K1, U1, U2, W1) ;CLASSES: Written test - Conducting at least two written tests consisting in solving by the student the tasks checking the degree of mastery of the lexical and grammatical material on a scale of 2-5(K1, U1, U2, W1)

Number of ECTS points: 1,5

Language of instruction angielski

Introductory courses:
none

Preliminary requirements:
declared knowledge of English at B2 level

Name of the organizational unit offering the course:
Zespół Języka Angielskiego,

Person in charge of the course:
mgr Anna Żebrowska,

Course coordinators:

Notes:
brak

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

Detailed description of the awarded ECTS points - part B

09149-25-C
ECTS:1,5
YEAR: 2018L

ENGLISH/POLISH LANGUAGE SUPPORT

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: classes	30 h
- consultation	2 h
	32 h

2. Student's independent work:

- preparation for tests	10 h
- preparing for tutorials, doing housework and presentations	11 h
	21 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 53 h : 1 h/ECTS = 53,00 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	32,00 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	-30,50 ECTS points,

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Wydział Nauk o Środowisku

Course / module syllabus - part A

ENVIRONMENTAL STATISTICS

ECTS: 2
YEAR: 2018L

COURSE CONTENT
CLASSES:

The role of statistics in environmental science. Environmental sampling. Models from data. Drawing conclusions from data. Impact assessment. Time series analysis. Spatial data analysis. Censored data. Risk assessment

LECTURES:

brak

EDUCATIONAL OBJECTIVE:

DESCRIPTION OF LEARNING OUTCOMES FOR THE COURSE IN REALATION TO FIELD AND MAJOR LEARNING OUTCOMES

Codes of learning outcomes in a major field of study:	T2A_K06+, T2A_U07++, T2A_W01+,
Codes of learning outcomes in a major area of study:	K2_K01+, K2_U05++, K2_W01+,

LEARNING OUTCOMES:

Knowledge

W1 - The Student knows and describes statistical approaches to specific environmental problems, knows a role statiscics play in environmental science

Skills

U1 - The Student collects data and uses sampling and experimental design
U2 - The student interprets results from approaches used in monitoring, impact assessment, and risk assessment procedures

Social competence

K1 - Student demonstrates an active attitude with respect to the local and global environmental problems. Students update their knowledge of key topics related to environmental sciences

BASIC LITERATURE

1) Walker C. H., Hopkin S. P., Sibly R. M., Peakall B., Principles of Ecotoxicology, Third Edition, wyd. CRC Press., 2005 ; 2) Manly, B.F. J., Statsitics for environmental science and management. 2nd ed., wyd. Chapman and Hall/CRC , 2010

SUPPLEMENTARY LITERATURE

Course / module
Environmental statistics
Fields of education:
Obszar nauk technicznych

Course status:	facultative
Course group:	brak
ECTS code:	
Field of study:	Environmental Engineering
Specialty area:	
Educational profile:	General academic
Form of study:	Stacjonarne
Level of study:	Drugiego stopnia/ masters
Year/Semester:	1 / 1

Type of course:
Auditorium classes

Number of hours per semester/week:	Auditorium classes: 30

Teaching forms and methods
Auditorium classes(K1, U1, U2, W1) :
Form and terms of the verification results:
AUDITORIUM CLASSES: Colloquium test - null(K1, U1, U2, W1)

Number of ECTS points:	2
Language of instruction	angielski

Introductory courses:
Preliminary requirements:

Name of the organizational unit offering the course:
Katedra Biotechnologii w Ochronie Środowiska,
Person in charge of the course:
prof. dr hab. Paweł Brzuzan,
Course coordinators:

Notes:
brak

ECTS code: AAABB-CD-E_F — AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

Detailed description of the awarded ECTS points - part B

ENVIRONMENTAL STATISTICS

ECTS:2
YEAR: 2018L

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: auditorium classes	30 h
- consultation	2 h
	32 h

2. Student's independent work:

0 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 32 h : 1 h/ECTS = 32,00 ECTS
average: **2 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	32,00 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	-30,00 ECTS points,

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Wydział Nauk o Środowisku

Course / module syllabus - part A

09149-25-C
ECTS: 1
YEAR: 2018L

GERMAN LANGUAGE
GERMAN LANGUAGE

COURSE CONTENT
CLASSES:

Treści nauczania zgodne z programem nauczania języka niemieckiego dla I semestru poziomu B2+, zgodnie z tabelą wymagań Europejskiego Systemu Opisu Kształcenia Językowego (ESOKJ), w cyklu 1 x 30 h = 30 h; analiza i praca z tekstami specjalistycznymi w języku niemieckim z zakresu gospodarki wodno-ściekowej, gospodarki odpadami, ekologicznej infrastruktury energetycznej, zarządzania zasobami i przeciwdziałania zagrożeniom środowiska, dostosowania firm i technologii do wymogów środowiskowych; tłumaczenie tekstów i artykułów z dziedziny inżynierii środowiska z języka polskiego na język niemiecki i z języka niemieckiego na język polski

LECTURES:

brak

EDUCATIONAL OBJECTIVE:

Developing language competences that allow students to understand, translate and use German specialist linguistics in the field of environmental engineering

DESCRIPTION OF LEARNING OUTCOMES FOR THE COURSE IN REALATION TO FIELD AND MAJOR LEARNING OUTCOMES

Codes of learning outcomes in a major field of study:	T2A_K01+, T2A_U03+, T2A_U04+, T2A_U06++, T2A_W05+,
Codes of learning outcomes in a major area of study:	K2_K03+, K2_U04+, K2_U16+, K2_W17+,

LEARNING OUTCOMES:

Knowledge

W1 - The student has the knowledge necessary to understand and formulate statements in German, containing specialist vocabulary in the field of a given field of study, according to the table of requirements for the B2 + CEFR level and in proportion to the number of hours planned.

Skills

U1 - The student uses specialist terminology in the field of study, in proportion to the number of hours planned
U2 - The student reads with understanding and critically analyzes texts containing specialized lexicon in the field of study

Social competence

K1 - The student understands the importance of foreign language skills, including German as one of the conference languages; appreciates the importance of foreign language skills as an element allowing for a better position in the conditions of growing competition on the labor market.

BASIC LITERATURE

1) Wolfhart Duerschmitt, Dieter Boehme, Elke Hammer, Erneuerbare Energien, wyd. BMU, 2011

SUPPLEMENTARY LITERATURE

Course / module
German Language
Fields of education:
Obszar nauk technicznych

Course status:	facultative
Course group:	brak
ECTS code:	09149-25-C
Field of study:	Environmental Engineering
Specialty area:	
Educational profile:	General academic
Form of study:	Stacjonarne
Level of study:	Drugiego stopnia/ masters
Year/Semester:	1 / 1

Type of course:
Classes

Number of hours per semester/week: Classes: 30

Teaching forms and methods
Classes(K1, U1, U2, W1) : Communicative method with elements of the grammatical-translation method

Form and terms of the verification results:
CLASSES: Evaluation of the work and cooperation in the group - The student is assessed on a scale of 2-5 for activity, creativity and correctness of tasks in the group.(K1, U1, U2, W1) ;CLASSES: Written test - Conducting at least two written tests consisting in solving by the student the tasks checking the degree of mastery of the lexical and grammatical material on a scale of 2-5(K1, U1, U2, W1)

Number of ECTS points: 1

Language of instruction angielski

Introductory courses:
none

Preliminary requirements:
declared knowledge of German at B2 level

Name of the organizational unit offering the course:
Zespół Języka Angielskiego,

Person in charge of the course:
mgr Anna Żebrowska,

Course coordinators:

Notes:
brak

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

Detailed description of the awarded ECTS points - part B

09149-25-C
ECTS:1
YEAR: 2018L

GERMAN LANGUAGE
GERMAN LANGUAGE

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: classes	30 h
- consultation	2 h
	32 h

2. Student's independent work:

- preparation for tests	10 h
- preparing for tutorials, doing housework and presentations	11 h
	21 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 53 h : 1 h/ECTS = 53,00 ECTS
average: **1 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	32,00 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	-31,00 ECTS points,

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Wydział Nauk o Środowisku

Course / module syllabus - part A

ECTS: 1
YEAR: 2018L

MONITORING OF AEROBIC STABILIZATION OF MUNICIPAL SOLID WASTE
MONITORING OF AEROBIC STABILIZATION OF MUNICIPAL SOLID WASTE

COURSE CONTENT
CLASSES:

Observation of the stabilization process of municipal waste in conditions of passive aeration in time real. Preparation of the test stand in laboratory conditions. Getting to know the basic ones physicochemical analyzes related to the biological treatment of municipal waste solids. Determining selected parameters of municipal solid waste stability during their processing in conditions of passive aeration. Evaluation of the level of waste stability based on the obtained results

LECTURES:

brak

EDUCATIONAL OBJECTIVE:

DESCRIPTION OF LEARNING OUTCOMES FOR THE COURSE IN REALATION TO FIELD AND MAJOR LEARNING OUTCOMES

Codes of learning outcomes in a major field of study:	T2A_K02+, T2A_K03+, T2A_K04+, T2A_K06+, T2A_U02+, T2A_U05+, T2A_U09+, T2A_W02+,
Codes of learning outcomes in a major area of study:	K2_K01+, K2_U02+, K2_U09+, K2_W06+,

LEARNING OUTCOMES:

Knowledge

W1 - The student learns the basic technological aspects of the process of stabilizing waste in conditions aerobic, tendencies of changes in physicochemical parameters during the process, including their dependence on the degree stability of waste. After completing the course, the student should have basic knowledge in the field of optimization the process of stabilizing municipal waste on a technical scale, based on the analysis of basic criteria stability, such as AT4 - four-day respirometric activity or LOI - loss on ignition

Skills

U1 - During the course of classes, the student acquires the ability to assess the effectiveness of the technological process based on the biological treatment of municipal waste under aerobic conditions
U2 - The student masters the basics of laboratory techniques in the analysis of conditions taking place inside oxygen reactor to stabilize waste

Social competence

K1 - The program of classes has been prepared in such a way as to provide students with competences to work in factories processing of municipal and organic waste, having in its technological equipment composting of municipal waste, sewage sludge or green waste. Knowledge acquired Technological also gives the basics from mastering the technology of bio-waste in the aspect of fuel production alternative

BASIC LITERATURE

1) Roger Tim Haug, The Practical Handbook of Compost Engineering, wyd. CRC Press, 1993 ; 2) Alessandro Chiumenti, Modern composting technologies, wyd. JG Press, 2005 ; 3) T. V. Ramachandra, Management of Municipal Solid Waste, wyd. TERI Press, 2006 ; 4) L.F. Diaz, M. de Bertoldi, W. Bidlingmaier, Compost Science and Technology, wyd. Elsevier, 2011 ; 5) Heribert Insam, Nuntavun Riddech, Susanne Klammer, Microbiology of Composting, wyd. Springer, 2002, t. 14

SUPPLEMENTARY LITERATURE

Course / module
Monitoring of aerobic stabilization of municipal solid waste

Fields of education:
Obszar nauk technicznych

Course status:	facultative
Course group:	brak
ECTS code:	
Field of study:	Environmental Engineering
Specialty area:	
Educational profile:	General academic
Form of study:	Stacjonarne
Level of study:	Drugiego stopnia/ masters
Year/Semester:	1 / 1

Type of course:
Laboratory classes

Number of hours per semester/week:	Laboratory classes: 15

Teaching forms and methods
Laboratory classes(K1, U1, U2, W1) :

Form and terms of the verification results:
LABORATORY CLASSES: Report - null(W1) ;LABORATORY CLASSES: Write-up - null(K1, U1, U2)

Number of ECTS points:	1
Language of instruction	angielski

Introductory courses:

Preliminary requirements:

Name of the organizational unit offering the course:
Katedra Biotechnologii w Ochronie Środowiska,

Person in charge of the course:
dr inż. Sławomir Kasiński,

Course coordinators:

Notes:
brak

ECTS code: AAABB-CD-E_F

AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

Detailed description of the awarded ECTS points - part B

ECTS:1
YEAR: 2018L

MONITORING OF AEROBIC STABILIZATION OF MUNICIPAL SOLID WASTE

MONITORING OF AEROBIC STABILIZATION OF MUNICIPAL SOLID WASTE

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: laboratory classes	15 h
- consultation	2 h
	17 h

2. Student's independent work:

	0 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 17 h : 1 h/ECTS = 17,00 ECTS

average: **1 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	17,00 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	-16,00 ECTS points,

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Wydział Nauk o Środowisku

Course / module syllabus - part A

TECHNIQUES OF GENETIC ENGINEERING

ECTS: 3
YEAR: 2018L

COURSE CONTENT
CLASSES:

DNA extraction from bacterial communities. Amplification of catabolic gene fragment by PCR. Detection of catabolic genes. Ribosomal Intergenic Spacer Analysis. Estimation of microbial community biodiversity using molecular approaches. Polyacryloamide gel electrophoresis. Quantification of the catabolic genes. Analysis of DNA fingerprints. Plasmid isolation from E. coli. Plasmid restriction analysis. Agarose gel electrophoresis of digested plasmids.

LECTURES:

Introduction to genetic engineering and molecular biology of microorganisms. The basic tools of genetic engineering. Molecular methods (RISA, DGGE, T-RFLP) of microbial diversity analysis. Indices of biodiversity. Methods of bacterial activity measurement (mRNA and bioreporter strains). Microbial activity during bioremediation processes

EDUCATIONAL OBJECTIVE:

DESCRIPTION OF LEARNING OUTCOMES FOR THE COURSE IN REALATION TO FIELD AND MAJOR LEARNING OUTCOMES

Codes of learning outcomes in a major field of study:	T2A_K02+, T2A_K03+, T2A_K04+, T2A_K05+, T2A_K06+, T2A_K07+, T2A_U01+, T2A_U10++, T2A_U17+, T2A_U19+, T2A_W06++,
Codes of learning outcomes in a major area of study:	K2_K01+, K2_K02+, K2_U01+, K2_U14+, K2_W10++,

LEARNING OUTCOMES:

Knowledge

W1 - Student will have knowledge concerning methods of analysis and recombination of DNA
W2 - Student will know molecular methods useful for the study of microbial diversity and activity

Skills

U1 - Student should acquire skills of DNA analysis, especially electrophoretic methods of DNA examination, gene fragments amplification using Polymerase Chain Reaction
U2 - Student should acquire ability to microbial diversity and genetic distance estimation on the base of DN fingerprints

Social competence

K1 - Student will understand the potential risk of Genetically Modified Organisms application
K2 - Student should be aware of responsibility of Genetic Modified Organisms spread in environment

BASIC LITERATURE

1) Glick B. R., Pasternak J. J., Patten C. L., Molecular Biotechnology. Principles and applications of recombinant DNA. , wyd. ASM Press, 2010

SUPPLEMENTARY LITERATURE

Course / module
Techniques of genetic engineering
Fields of education:
Obszar nauk technicznych
Course status: facultative
Course group: brak
ECTS code:
Field of study: Environmental Engineering
Specialty area:
Educational profile: General academic
Form of study: Stacjonarne
Level of study: Drugiego stopnia/ masters
Year/Semester: 1 / 1

Type of course:
Laboratory classes, Lecture
Number of hours per semester/week: Laboratory classes: 24, Lecture: 6
Teaching forms and methods
Laboratory classes(K1, K2, U1, U2) : , Lecture(W1, W2) :
Form and terms of the verification results:
LABORATORY CLASSES: Report - null(K1, K2, U1, U2) ;LECTURE: Written exam - null(U1, W1, W2)
Number of ECTS points: 3
Language of instruction angielski
Introductory courses:
Preliminary requirements:

Name of the organizational unit offering the course:
Katedra Biotechnologii w Ochronie Środowiska,
Person in charge of the course:
dr hab. Sławomir Ciesielski, prof. UWM
Course coordinators:

Notes:
brak

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

Detailed description of the awarded ECTS points - part B

TECHNIQUES OF GENETIC ENGINEERING

ECTS:3
YEAR: 2018L

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: laboratory classes	24 h
- participation in: lecture	6 h
- consultation	4 h
	34 h

2. Student's independent work:

0 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 34 h : 1 h/ECTS = 34,00 ECTS

average: **3 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	34,00 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	-31,00 ECTS points,

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Wydział Nauk o Środowisku

Course / module syllabus - part A

ECTS: 3
YEAR: 2018L

TOXICOLOGY
TOXICOLOGY

COURSE CONTENT
CLASSES:

Health and Safety regulations, organizational issues, introduction to the subject. User manual of the molecular biology equipment. Pippetting micro volumes of liquids with different physical properties (density, viscosity). Part I. Analysis of gene expression after exposure to model toxic substance (a case study): Total RNA isolation. Spectrophotometric measurement of quantity and purity of the isolated samples. Assessment of RNA integrity. Elimination of genomic DNA from the samples. Reverse transcription. Introduction to nonparametric statistical tests. GenBank search for nucleotide sequences. Polymerase chain reaction (PCR) primers design. Analysis of gene expression using semi-quantitative PCR (SQ-PCR). Analysis of gene expression using real-time quantitative PCR (qPCR). Calculations on raw values, presentation of the obtained results, analysis for statistical significance. Preparation of laboratory report. Overview of the current scientific literature available online. Part II. Polymorphism analysis of genes participating in detoxication mechanism: Isolation of genomic DNA from students' cheek swab. Conventional PCR. Agarose electrophoresis. Analysis and interpretation of the obtained results.

LECTURES:

Toxic chemical risk. Environmental pathways of toxic chemicals. The body's defenses against chemical toxicity. Mechanisms of chemical disease. PCR-based protocols in molecular toxicology.

EDUCATIONAL OBJECTIVE:

DESCRIPTION OF LEARNING OUTCOMES FOR THE COURSE IN REALATION TO FIELD AND MAJOR LEARNING OUTCOMES

Codes of learning outcomes in a major field of study:	T2A_K01+, T2A_K02+, T2A_K03+, T2A_K04+, T2A_K06+, T2A_U01+, T2A_U03+, T2A_U04+, T2A_U08++, T2A_U10+, T2A_W01+,
Codes of learning outcomes in a major area of study:	K2_K01+, K2_K03+, K2_U01+, K2_U03+, K2_U06++, K2_W02+,

LEARNING OUTCOMES:

Knowledge

W1 - Student describes the selected pollutants and explains their toxic effects at different levels of biological organization

Skills

U1 - Student classifies different responses of organisms and formulates simple hypotheses concerning the toxicity of selected contaminants
U2 - The student interprets the results obtained from the experiments carried out by the use of gained knowledge of the natural sciences and engineering
U3 - The student has the skills to operate basic equipment of the molecular biology lab

Social competence

K1 - Student demonstrates an active attitute with respect to the local and global environmental problems. The student cooperates with other students in a scientific experiment
K2 - Students update their knowledge from ecotoxicology and molecular toxicology and knows its practical application in environmental monitoring

BASIC LITERATURE

1) Brown T.A, Genomes 3, wyd. Garland Science Publishing, 2007 ; 2) Brzuzan P., Woźny M.,, Toxicology. Student's coursebook. Deparment of Environmental Biotechnology, wyd. d. University of Warmia and Mazury in Olsztyn, Poland, 2012 ; 3) Penningroth, S., Essentials of Toxic Chemical Risk Science and Society, wyd. CRC Press, London, 2010 ; 4) Walker C. H., Hopkin S. P., Sibly R. M., Peakall B., Principles of Ecotoxicology, Third Edition., wyd. wyd. CRC Press, 2005 ; 5) McCarthy J.F., Shugart L.R., Biomarkers of environmental contamination., wyd. Lewis Publishers, 1990

SUPPLEMENTARY LITERATURE

Course / module
Toxicology
Fields of education:
Obszar nauk technicznych

Course status:	facultative
Course group:	brak
ECTS code:	
Field of study:	Environmental Engineering
Specialty area:	
Educational profile:	General academic
Form of study:	Stacjonarne
Level of study:	Drugiego stopnia/ masters
Year/Semester:	1 / 1

Type of course:
Laboratory classes, Lecture

Number of hours per semester/week:	Laboratory classes: 25, Lecture: 5

Teaching forms and methods
Laboratory classes(K1, K2, U3, W1) : , Lecture(K2, U1, U2, W1) :

Form and terms of the verification results:
LABORATORY CLASSES: Report - null(K1, K2, U3, W1) ;LECTURE: Written exam - null(K2, U1, U2, W1)

Number of ECTS points:	3
Language of instruction	angielski

Introductory courses:

Preliminary requirements:

Name of the organizational unit offering the course:
Katedra Biotechnologii w Ochronie Środowiska,

Person in charge of the course:
prof. dr hab. Paweł Brzuzan,

Course coordinators:

Notes:
brak

ECTS code: AAABB-CD-E_F

AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

Detailed description of the awarded ECTS points - part B

ECTS:3
YEAR: 2018L

TOXICOLOGY
TOXICOLOGY

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: laboratory classes	25 h
- participation in: lecture	5 h
- consultation	4 h
	34 h

2. Student's independent work:

0 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 34 h : 1 h/ECTS = 34,00 ECTS

average: **3 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	34,00 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	-31,00 ECTS points,

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Wydział Nauk o Środowisku

Course / module syllabus - part A

ECTS: 4
YEAR: 2018L

WATER AND WASTEWATER TREATMENT
WATER AND WASTEWATER TREATMENT

Course / module
Water and wastewater treatment
Fields of education:
Obszar nauk technicznych
Course status: facultative
Course group: brak
ECTS code:
Field of study: Environmental Engineering
Specialty area:
Educational profile: General academic
Form of study: Stacjonarne
Level of study: Drugiego stopnia/ masters
Year/Semester: 1 / 1

Type of course:
Laboratory classes, Auditorium classes
Number of hours per semester/week: Laboratory classes: 56, Auditorium classes: 19
Teaching forms and methods
Laboratory classes(K1, U1, U2, U3) : , Auditorium classes(K2, U4, W1) :
Form and terms of the verification results:
LABORATORY CLASSES: Report - null(K1, K2, U4) ;AUDITORIUM CLASSES: Colloquium test - null(U1, U2, U3, W1)
Number of ECTS points: 4
Language of instruction angielski
Introductory courses:
Preliminary requirements:

Name of the organizational unit offering the course:
Katedra Biotechnologii w Ochronie Środowiska,
Person in charge of the course:
dr hab. Magdalena Zielińska,
Course coordinators:

Notes:
up to 18 students

COURSE CONTENT
CLASSES:

Water treatment: iron and manganese removal by filtration, hardness removal by ion exchange, turbidity and color removal by membrane filtration; determination of operating parameters of the processes. Evaluation of the effectiveness of wastewater treatment depending on the composition of wastewater. Technological parameters of the conventional activated sludge in totally mixed activated sludge reactors integrated with a membrane module. Nitrogen balance in wastewater treatment systems. Presentation of the biomass cultivation technologies in wastewater treatment systems including activated sludge, biofilm and aerobic granular sludge. Enzymatic activity of the biomass. The role of extracellular polymers in formation of complex microbial structures. Evaluation of the abundance and diversity of nitrogen-converting microorganisms using molecular biology methods, depending on the composition of the wastewater. Theoretical bases of high-throughput sequencing (pyrosequencing). Sewage sludge digestion (primary and excess sludge). Respirometric test (GP21) used in determination of the biogas production during anaerobic processes

LECTURES:

brak

EDUCATIONAL OBJECTIVE:

DESCRIPTION OF LEARNING OUTCOMES FOR THE COURSE IN REALATION TO FIELD AND MAJOR LEARNING OUTCOMES

Codes of learning outcomes in a major field of study:	T2A_K01+, T2A_K02+, T2A_K03+, T2A_K04+, T2A_K06+, T2A_U03+, T2A_U04++, T2A_U07+, T2A_U09+, T2A_W03+,
Codes of learning outcomes in a major area of study:	K2_K01+, K2_K03+, K2_U03+, K2_U05+, K2_U09+, K2_U13+, K2_W09+,

LEARNING OUTCOMES:

Knowledge

W1 - Characterizes and knows the selected unit processes, technological solutions and mechanisms used in water, wastewater and sludge treatment. Defines technological parameters of water and wastewater treatment. Defines the types of biomass in wastewater treatment sysmes and recognizes the relationships between technological parameters of wastewater treatment and the structure of microbial consortia in activated sludge. Characterizes the composition of extracellular polymers and defines their role in the formation of complex microbial structures. Understands the role of extracellular enzymes in biological tretament. Characterizes groups of nitrogen-converting microorganisms in astewater treatment systems. Lists the molecular biology techniques used to evaluate the abundance and diversity of microorganisms in wastewater treatment systems, including emerging technologies. Recognizes the possibilities of use of solar energy and the enrgy coming from anaerobic disgestion of sewage sludge for

Skills

U1 - Analyzes the selected unit processes used in water and wastewater treatment, understands their role in the technologies used in environmental protection. Determines experimentally the operational parameters of water and wastewater treatment. Determines the effectiveness of wastewater treatment by activated sludge method,depending on the composition of wastewater
U2 - Calculates the nitrogen balance in wastewater treatment systems. Calculates the amount and the volume of sewage sludge produced in biological systems. Can determine biogas productivity during anaerobic processes
U3 - Knows how to interpret the relationships between the molecular and technological results. Knows how to characterize biomass in wastewater treatment systems. Knows how to apply techniques of molecular biology in order to obtain information about the microorganisms that inhabit wastewater treatment systems
U4 - Can write a report from the conducted experiments

Social competence

K1 - Is aware of the importance of technologies to prevent environmental degradation. Is able to work in the team
K2 - Is aware of the need for learning throughout life

BASIC LITERATURE

1) Snyder L., Champness W., Molecular Genetics of Bacteria, wyd. ASM Press, 2007 ; 2) Wojnowska-Baryła I., Cydzik-Kwiatkowska A., Zielińska M., The application of molecular techniques to the study of wastewater treatment systems, Methods in molecular biology, wyd. Clifton, N.J., 2010, t. 599, s. 157-183; 3) different authors, Materials and laboratory protocols given by a teacher, wyd. author's script, 2018 ; 4) Spiro T.G., Stigliani W.M., Chemistry of the Environment, 2nd Edition, wyd. Prentice Hall, 2002

SUPPLEMENTARY LITERATURE

Detailed description of the awarded ECTS points - part B

ECTS:4
YEAR: 2018L

WATER AND WASTEWATER TREATMENT
WATER AND WASTEWATER TREATMENT

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: auditorium classes	19 h
- participation in: laboratory classes	56 h
- consultation	2 h
	77 h

2. Student's independent work:

0 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 77 h : 1 h/ECTS = 77,00 ECTS

average: **4 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	77,00 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	-73,00 ECTS points,

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

UNIVERSITY OF WARMIA AND MAZURY IN OLSZTYN

Wydział Nauk o Środowisku

Course / module syllabus - part A

06049-24-C
ECTS: 2
YEAR: 2018L

WRITING SCIENTIFIC PAPERS
WRITING SCIENTIFIC PAPERS

COURSE CONTENT
CLASSES:

1. Variety of publications, 2. Planning, 3. Organising the paper, 4. Dealing with copyright, 5. Outlining the paper, 6. Writing the first draft, 7. Writing the Abstract and Introduction, 8. Writing the Results section, 9. How to write the Discussions, 10. Impact Factor (IF) and Hirsch Index (HI) (h-index), 11. Diagrams, 12. Photomicrographs, 13. Charts and tables, 14. Slides, 15. Posters

LECTURES:

How to read, write, present and publish scientific papers

EDUCATIONAL OBJECTIVE:

HOW TO WRITE SCIENCE WORKS

DESCRIPTION OF LEARNING OUTCOMES FOR THE COURSE IN REALATION TO FIELD AND MAJOR LEARNING OUTCOMES

Codes of learning outcomes in a major field of study:	T2A_K01+, T2A_K02+, T2A_K03+, T2A_K04+, T2A_K06+, T2A_U03++, T2A_U04++, T2A_U06++, T2A_W01+, T2A_W05+, T2A_W10+,
Codes of learning outcomes in a major area of study:	K2_K01+, K2_K03+, K2_U04++, K2_W01+, K2_W15+, K2_W17+,

LEARNING OUTCOMES:

Knowledge

W1 - Knowledge of the principles of the preparation, presentation and writing scientific publications
W2 - Knowledge of specialty

Skills

U1 - Presentation (oral and written) in English rules of writing, publishing and presenting scientific papers.
U2 - Practical rules of writing and presenting scientific papers (publication, poster, presentation)

Social competence

K1 - Creativity in scientific work; proactive in expressing evaluations; willingness to cooperate in a team; aware of the continuous growth of knowledge and progress methodically
K2 - Orientation for their own intellectual development; proceedings in accordance with the rules of ethics

BASIC LITERATURE

1) Łuczyński M., Writing Scientific Papers. Materials for internal use at the Department of Environmental Biotechnology., wyd. Skrypt autorski, 2016

SUPPLEMENTARY LITERATURE

Course / module
Writing scientific papers

Fields of education:
Obszar nauk technicznych

Course status:	facultative
Course group:	C - przedmioty specjalnościowe
ECTS code:	06049-24-C
Field of study:	Environmental Engineering
Specialty area:	Environmental Biotechnology
Educational profile:	General academic
Form of study:	Stacjonarne
Level of study:	Drugiego stopnia/ masters
Year/Semester:	1 / 1

Type of course:
Lecture, Auditorium classes

Number of hours per semester/week:	Lecture: 15, Auditorium classes: 15

Teaching forms and methods
Lecture(W1, W2) : Lecture information lecture , Auditorium classes(K1, K2, U1, U2) : classes: panel discussion

Form and terms of the verification results:
LECTURE: Colloquium test - test(K1, K2, U1, U2, W1, W2) ;AUDITORIUM CLASSES: Colloquium test - test(K1, K2, U1, U2, W1, W2)

Number of ECTS points:	2
Language of instruction	polski

Introductory courses:
none

Preliminary requirements:
none

Name of the organizational unit offering the course:

Person in charge of the course:

Course coordinators:

Notes:
brak

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.

Detailed description of the awarded ECTS points - part B

06049-24-C
ECTS:2
YEAR: 2018L

WRITING SCIENTIFIC PAPERS
WRITING SCIENTIFIC PAPERS

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: auditorium classes	15 h
- participation in: lecture	15 h
- consultation	2 h
	32 h

2. Student's independent work:

- preparation for completing the course	18 h
	18 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 50 h : 25 h/ECTS = 2,00 ECTS
average: **2 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher: 1,28 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work: 0,72 ECTS points,

ECTS code: AAABB-CD-E_F AAA - subject area code in the ECTS system, BB - major number, C - 1 first-cycle (engineer's degree or bachelor's degree)studies, 2 - second-cycle studies, 3 - uniform masters'degree studies, 4 - third-cycle studies, 5 - postgraduate studies, D -specialty number, E - course group, F - serial number of the course in the subset.