

A list of syllabus subjects

Field of study

Environmental Protection

Speciality area

Aquatic Ecosystem Protection

Level of study

second degree studies

Programm code

5609-SMU-PM_KRK



AQUATIC ECOSYSTEM MONITORING

01956-26-C

ECTS: 3,5

YEAR: 2018L

COURSE CONTENT
CLASSES:

The rules of monitoring of surface water and groundwater based on the latest legislation. Criteria for the selection of surface water for monitoring in the framework of monitoring: diagnostic, operational, research and protected areas and criteria for the designation of points for measurement and control. The method of collecting representative samples of surface water and groundwater. Assessment of potential risks and indicators of water pollution in the country and in the Warmia and Mazury. The choice of methods used in the analyses of water and the scope and frequency of research. Determination of selected quality indicators in surface waters. Analysis of the purity of surface water in Warmia and Mazury. Forecasting changes in the state of environment and the selection of preventive measures to counter the negative effects of the discharge of pollutants into aquatic ecosystems.

LECTURES:

Organization and review of the monitoring programs of water ecosystems in Poland since the start of its operations. The current structure of the State Environmental Monitoring and monitoring of aquatic ecosystems. Characteristics of tasks in monitoring of aquatic ecosystems. Cooperation with the European Environment Agency and other international organizations occupied monitoring research. Quality and information systems in environmental monitoring. Dissemination of research of monitoring results.

EDUCATIONAL OBJECTIVE:

Understanding the scope of monitoring of aquatic ecosystems and water quality in relation with other components of the environment, especially with standards in Poland and European Union.

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:

P2A_K01+, P2A_K04+, P2A_K05+, P2A_K07+, P2A_U01+, P2A_U07+, P2A_W02+, R2A_K01+, R2A_K05+, R2A_K07+, R2A_U01+, R2A_W03+, R2A_W05+,

Codes of learning outcomes in a major area of study:

K2A_K01+, K2A_K07+, K2A_K10+, K2A_U01+, K2A_U15+, K2A_W03+, K2A_W05+,

LEARNING OUTCOMES:

Knowledge

W1 - Student knows the structure and programs of the monitoring of water ecosystems implemented in recent years, legislation, pollution indicators and methods used in the study of the aquatic environment and the trends of changes in water pollution and related other environmental elements.

Skills

U1 - Student gains the ability to interpret of results of research and assessment of the state of main elements in the environmental water ecosystems and the degree of exceeding the limit values for pollutants contained in the legislation - national and European Union, as well as the prediction of changes in the state of environment that may occur in the future.

Social competence

K1 - Student understands the need for systematic filling up of the knowledge of the research of the environment state of aquatic ecosystems, especially in the context of its pollution and he has aware of the importance of monitoring tests in environmental protection, the validity of preventive and conservation actions to prevent the negative effects of emissions to the individual components of the environment, mainly water.

K2 - Student demonstrates competence with knowledge of the scope and methods of research in the framework of monitoring.

BASIC LITERATURE

1) GIOŚ, Programy Państwowego Monitoringu Środowiska z lat 1992-2020 i na lata następne, wyd. GIOŚ, Warszawa, . ; 2) GIOŚ, Raporty o stanie środowiska w Polsce od roku 1992, wyd. GIOŚ, Warszawa, . ; 3) EAŚ, Raporty monitoringowe Europejskiej Agencji Środowiska, wyd. EAŚ, Kopenhaga, . ; 4) PMŚ, WIOŚ, Raporty monitoringowe poszczególnych podsystemów PMŚ i WIOŚ, wyd. PMŚ, WIOŚ, .

SUPPLEMENTARY LITERATURE

1) GUS, Ochrona środowiska 2017 oraz z lat wcześniejszych i późniejszych, wyd. GUS Warszawa, 2017 ; 2) EAŚ, <http://www.eea.europa.eu/pl/>, wyd. EAŚ ; 3) GIOŚ, <http://www.gios.gov.pl/>, wyd. GIOŚ ; 4) WIOŚ Olsztyn, <http://www.wios.olsztyn.pl/>, wyd. WIOŚ Olsztyn

Course / module

Aquatic Ecosystem Monitoring

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: mandatory

Course group: C - przedmioty specjalnościowe

ECTS code: 01956-26-C

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

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: 30; Lecture: 15

Teaching forms and methods

Laboratory classes(K1, K2, U1, W1) : Analysis of monitoring results, performing of laboratory experiments., Lecture(W1) : Lecture with multimedia presentation, information lecture.

Form and terms of the verification results:

LABORATORY CLASSES: Colloquium test - Positive mark of the colloquium tests.(K1, K2, U1, W1) ;LECTURE: Written exam - Positive mark of the exam. (W1)

Number of ECTS points: 3,5

Language of instruction: polski

Introductory courses:

Preliminary requirements:

Basic knowledge about environmental protection, including toxicology.

Name of the organizational unit offering the course:

Katedra Chemii Środowiska,

Person in charge of the course:

prof. dr hab. Mirosław Wyszowski,

Course coordinators:

Notes:

Liczebność grup maksimum 16 osób.

Detailed description of the awarded ECTS points - part B

01956-26-C
ECTS:3,5
YEAR: 2018L

AQUATIC ECOSYSTEM MONITORING

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: laboratory classes	30 h
- participation in: lecture	15 h
- consultation	4 h
	49 h

2. Student's independent work:

- preparation for colloquium tests	15 h
- preparation for laboratory classes	10,5 h
- preparation for written / oral exam	20 h
	45,5 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 94,5 h : 27 h/ECTS = 3,50 ECTS

average: **3,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	1,81 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	1,69 ECTS points,



Course / module syllabus - part A

DIPLOMA PRACTICE

13956-20-D

ECTS: 4

YEAR: 2018L

COURSE CONTENT

CLASSES:

Methods of planning and organization of research and scientific experiments. Scientific and research methods. phases the research process (formulating a research problem; formulating research hypotheses (solutions theoretical); practical planning of empirical proceedings; development of research methodology or plan experiences; collecting evidence; selection of statistical technique; verification of results; collecting and data processing). Respect for copyright in the planning and organization of scientific research.

LECTURES:

-

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: InzA_U06+, InzA_W02+, InzA_W05+, P2A_U06+, R2A_K01+, R2A_K07+, R2A_U04+, R2A_W05+,

Codes of learning outcomes in a major area of study: K2A_K01+, K2A_K07+, K2A_U04+, K2A_W14+,

LEARNING OUTCOMES:

Knowledge

W1 - Student has got extensive knowledge of the studied field, which he/she uses during the research and development of the master's thesis. He/she knows the principles of developing research methodology. He/she knows the rules of planning research experiment with e.g. respect for copyright

Skills

U1 - Conducts scientific research under the supervision of the promoter. It selects, collects data while maintaining intellectual property rights.

Social competence

K1 - The student is conscious the necessity of the planning and organization of scientific research. He develops the ability to work in a research team.

BASIC LITERATURE

1) Weiner J., Technika pisania i prezentowania przyrodniczych prac naukowych - Przewodnik praktyczny., wyd. Wydawnictwo Naukowe PWN., 2005 ; 2) Derntl M., Basics of research paper writing and publishing, wyd. Int. J. Technology Enhanced Learning, 2014, t. 6/2

SUPPLEMENTARY LITERATURE

Course / module

Diploma practice

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: facultative

Course group: C - przedmioty specjalnościowe

ECTS code: 13956-20-D

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 1

Type of course:

Practical training

Number of hours per semester/week: Practical training: null

Teaching forms and methods

Form and terms of the verification results:

PRACTICAL TRAINING: Report - Report - Student presents to the promoter a practice report (K1, U1, W1)(K1, U1, W1)

Number of ECTS points: 4

Language of instruction: polski

Introductory courses:

Preliminary requirements:

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształowania Środowiska,

Person in charge of the course:

prof. dr hab. inż. Katarzyna Glińska-Lewczuk,

Course coordinators:

Notes:

Studenci odbywają praktykę dyplomową w Jednostkach Uczelnianych, w których wykonują pracę dyplomową oraz w innych instytucjach, w których realizują badania naukowe.

Detailed description of the awarded ECTS points - part B

13956-20-D
ECTS:4
YEAR: 2018L

DIPLOMA PRACTICE

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- consultation	160 h
<hr/>	
	160 h

2. Student's independent work:

0 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 160 h : 30 h/ECTS = 5,33 ECTS
average: **4 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	5,33 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	-1,33 ECTS points,



Course / module syllabus - part A

FOREIGN LANGUAGE

09156-29-O

ECTS: 2

YEAR: 2018L

**COURSE CONTENT
CLASSES:**

During the course, student learn vocabulary and grammar, including selected elements of specialist language, that will enable them to communicate in a foreign language; analysis of scientific texts, discussions, language exercises, translating texts, presenting various learning techniques, encouraging self-assessment, identification and formulation of linguistic rules, various methods of instruction (individual, in pairs, in groups), selection of exercises that are best adapted to the student's ability and personality.

LECTURES:

-

EDUCATIONAL OBJECTIVE:

Developing and developing language competences that allow students to understand, translate and use specialized lexicon in a given field of study at B2 + level

**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: P2A_U02+, P2A_U12+, P2A_W08+, R2A_K01+, R2A_U10+,

Codes of learning outcomes in a major area of study: K2A_K01+, K2A_U10+, K2A_W02+,

LEARNING OUTCOMES:**Knowledge**

W1 - The student has the knowledge necessary to understand and formulate statements in a foreign language, containing specialist lexicon 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; has knowledge of the problems currently presented in foreign language directional literature

Skills

U1 - The student has language skills that allow the use of specialist terminology, in the fields of science and scientific disciplines relevant to the studied field of study, speaking in a discussion or scientific debate, presenting his own arguments and opinions, asking questions, polemicising with the arguments of other interlocutors; can translate not very complex specialized texts

Social competence

K1 - The student understands the importance of knowledge of a foreign language as one of the conference languages and an element allowing to take a better position in the conditions of growing competition on the labor market; is aware of the need to learn throughout life

BASIC LITERATURE

1) Keith Kelly, Science, wyd. Macmillan, 2007 ; 2) Keith Kelly, Geography, wyd. Macmillan, 2007 ; 3) Bonamy D., Technical English, wyd. Pearson, 2011 ; 4) MacKenzie I., English for Business Studies, wyd. Cambridge University Press, 2010 ; 5) Grice T., Nursing 2, wyd. Oxford University Press , 2007 ; 6) W. Binerowska, S. Rokitina, W. Rotkiewicz, W. Skukowski, Język rosyjski dla studentów Technologii Żywności, wyd. wyd. ART w Olsztynie, 1994 ; 7) W. Roszczenko, M. Wójcik, Teksty rosyjskie i ćwiczenia dla kierunku ochrona środowiska, wyd. wyd. AR w Lublinie, 1999 ; 8) I. Obłąkowska-Galanciak, B. Jeglińska, Język rosyjski w turystyce, wyd. wyd. UWM, 2002 ; 9) G. Drozdowska, M. Sztolberg, Język rosyjski dla studentów Pedagogiki, wyd. wyd. II. Wyd. UMK w Toruniu, 1995 ; 10) A. Buczel, Rosyjski w biznesie, wyd. . Edgard Języki obce, 2009 ; 11) Schlüter S., Menschen Berufstrainer, wyd. Hueber Verlag, 2015 ; 12) Grigull I., Raven S., Geschäftliche Begegnungen, wyd. Schubert-Verlag, 2015

SUPPLEMENTARY LITERATURE

1) Malcolm Mann, Destination Grammar and Vocabulary, wyd. Macmillan, 2005

Course / module

Foreign Language

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: facultative**Course group:** O - przedmioty kształcenia ogólnego**ECTS code:** 09156-29-O**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**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, W1) : - work with specialized text, text analysis and vocabulary - discussion - role-play - "warming-up" and "brainstorming" exercises - grammatical, lexical, translational and refresher exercises - work with audiovisual material (notes, summary, playback, etc.)

Form and terms of the verification results:

CLASSES: Competention test - written test checking student's knowledge and skills in the use of specialized terminology(K1, U1, W1) ;CLASSES: Evaluation of the work and cooperation in the group - The student is assessed for the activity, creativity and correctness of performing tasks in the group (K1, U1, W1)

Number of ECTS points: 2**Language of instruction** polski**Introductory courses:**

lack

Preliminary requirements:

Declared knowledge of a foreign language at B2 level

Name of the organizational unit offering the course:

Katedra Agrotechnologii, Zarządzania Produkcją Rolniczą i Agrobiznesu,

Person in charge of the course:

prof. dr hab. inż. Krzysztof Jankowski,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

09156-29-O
ECTS:2
YEAR: 2018L

FOREIGN LANGUAGE

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: classes	30 h
- consultation	1 h
	31 h

2. Student's independent work:

-	29 h
	29 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 60 h : 30 h/ECTS = 2,00 ECTS
average: **2 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher: 1,03 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work: 0,97 ECTS points,



01056-29-F

INFORMATION TECHNOLOGIES IN ENVIRONMENTAL PROTECTION

ECTS: 2

YEAR: 2018L

COURSE CONTENT

CLASSES:

Procedures for statistical analysis of research results for master's theses using the excel spreadsheet and the Statistica package; engineering graphics using available software. computer support LCA analysis

LECTURES:

Concept of information technology; coding systems for letters and numbers; computer architecture; mathematical algorithm and computer algorithm; programming process. Software for statistical, graphic and LCA analysis. Spreadsheets. LAN / MAN / WAN network technologies.

EDUCATIONAL OBJECTIVE:

to transfer of knowledge about the possibilities of using computer programs to support the various spheres of environmental protection; to gain skills to handle specialized software in various information technologies, including image analysis, statistical data, and supporting the activities in practice using satellite techniques

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: P2A_K05+, P2A_K07+, P2A_U01+, P2A_W06+, P2A_W10+, R2A_K07+, R2A_U01+, R2A_W08+,

Codes of learning outcomes in a major area of study: K2A_K07+, K2A_U01+, K2A_W08+, K2A_W10+,

LEARNING OUTCOMES:

Knowledge

W1 - Student presents knowledge of the use of software for the statistical development of results adapted to the specifics of conducting experiments in broadly understood environmental protection.

W2 - Student knows and understands the basic concepts and principles of industrial property protection and copyright

Skills

U1 - Student uses IT technologies for the acquisition and processing of environmental information and presents the developed materials using IT tools. Consciously utilizes modern information technology in the field of data collection, calculation, interpretation and presentation of environmental performance

Social competence

K1 - Student is aware of the need for further training and self-improvement in the field of IT support in the effective pursuit of the profession

BASIC LITERATURE

1) Gołaszewski J., Informatyka w zarysie, wyd. UWM Olsztyn, 2002, s. 170; 2) Mathew A., Murugesan S.K., Fundamentals of Information Technology, wyd. Alpha Science International, 2013, s. 236

SUPPLEMENTARY LITERATURE

Course / module

Information Technologies in environmental protection

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: mandatory

Course group: F - przedmioty do wyboru (humanistyczno-ekonomiczno-społeczno-przyrodnicze)

ECTS code: 01056-29-F

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 1

Type of course:

Lecture, Computer classes

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

Teaching forms and methods

Lecture(K1, U1, W1, W2) : Lecture with a multimedia presentation, Computer classes(K1, U1, W1, W2) :

Form and terms of the verification results:

LECTURE: Oral test - oral answer to lecture content(K1, U1, W1, W2) ;COMPUTER CLASSES: Colloquium practical - null(K1, K1, U1, U1, W1, W1, W2, W2)

Number of ECTS points: 2

Language of instruction: polski

Introductory courses:

Preliminary requirements:

Name of the organizational unit offering the course:

Katedra Hodowli Roślin i Nasiennictwa,

Person in charge of the course:

prof. dr hab. inż. Janusz Gołaszewski,

Course coordinators:

Notes:

Detailed description of the awarded ECTS points - part B

01056-29-F **INFORMATION TECHNOLOGIES IN ENVIRONMENTAL PROTECTION**
ECTS:2
YEAR: 2018L

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: computer classes	20 h
- participation in: lecture	10 h
- consultation	1 h
	31 h

2. Student's independent work:

-	10 h
-	9 h
	19 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:	1,24 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,76 ECTS points,



LIMNOLOGY

13956-29-C

ECTS: 3,5

YEAR: 2018L

COURSE CONTENT
CLASSES:

LECTURES:

EDUCATIONAL OBJECTIVE:

General introduction to lakes and lake types. Origin and morphometry of lakes. Lake basins. The hydrological cycle and lake watersheds. Types of lakes. Water properties, heat and stratification. Abiotic elements of freshwater ecosystems. Physical factors affecting lakes - Light, Heat, Temperature. Water movement and oxygen distribution in lakes. Waves and Currents. Trophic gradients. Eutrophication: causes, consequences and trophic status. Major ions, conductivity and salinity of lake water. Water quality monitoring. Classification of lakes. Biodiversity of lakes. Functioning of the littoral zone in lakes. Primary and secondary production. The methods of monitoring, conservation, management and habitat restoration. Susceptibility of lakes to degradation – methods of estimation.

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: InzA_K01+, P2A_U01+, P2A_W02+, P2A_W04+, R2A_U05+,

Codes of learning outcomes in a major area of study: K2A_K05+, K2A_U05+, K2A_W03+,

LEARNING OUTCOMES:

Knowledge

W1 - Student knows the basic principles of physics, chemistry, geology, and biology for understanding how lakes and streams function as aquatic ecosystems Student defines basic genetic types of lakes, basic rules of lake functioning and defines the role of lakes in the environment Student is able to analyze threats of a given ecosystem and indicate causes of its degradation

Skills

U1 - Student recognizes the morphometrical elements of a lake basin, indicates morphogenetic types of lakes, knows basic principles of calculation of water resources in a lake Student can recognize basic groups of freshwater organisms Student is able to assess the trophic state and susceptibility of a given lake to degradation

Social competence

K1 - Student knows the important role of lakes in the environment and feels the need of their protection Student is environmentally conscious and open to the discussion

BASIC LITERATURE

1) Wetzel R.G, "Limnology: Lake and River Ecosystems.", , wyd. Academic Press, 2001 ; 2) Golterman. H. L. , , Physiological Limnology: An Approach to the Physiology of Lake Ecosystems, wyd. Elsevier Scientific Pub.Co. , 1975 ; 3) Scheffer M. , Ecology of Shallow Lakes, wyd. Chapman and Hall. London., 1988

SUPPLEMENTARY LITERATURE

Course / module

Limnology

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: mandatory

Course group: C - przedmioty specjalnościowe

ECTS code: 13956-29-C

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

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: 30

Teaching forms and methods

Lecture(U1, W1) : Lectures with multimedia presentation. Discussion, Auditorium classes(K1, U1, W1) : The class includes a mix of lectures, discussion, guest speakers and site visits. Students are expected to do all of the assigned readings, participate in class discussions and activities in an active and informed manner, complete all of the assignments, and attend all required site visits.

Form and terms of the verification results:

LECTURE: Colloquium test - null(K1, U1, W1) ;AUDITORIUM CLASSES: Project - null(K1, U1, W1) ;AUDITORIUM CLASSES: Colloquium test - null(K1, U1, W1) ;AUDITORIUM CLASSES: Part in the discussion - null(K1, U1, W1)

Number of ECTS points: 3,5

Language of instruction: polski

Introductory courses:

hydrology, water ecosystems, ecology,

Preliminary requirements:

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształtowania Środowiska,

Person in charge of the course:

prof. dr hab. inż. Katarzyna Glińska-Lewczuk,

Course coordinators:

Notes:

Detailed description of the awarded ECTS points - part B

13956-29-C
ECTS:3,5
YEAR: 2018L

LIMNOLOGY

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: auditorium classes	30 h
- participation in: lecture	15 h
- consultation	4 h
	49 h

2. Student's independent work:

- final project on a topic of student's choice	15 h
- self-learning before auditory classes	15 h
- self-learning before mid-term and final reviews	15,5 h
	45,5 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 94,5 h : 27 h/ECTS = 3,50 ECTS

average: **3,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	1,81 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	1,69 ECTS points,



PHYSICAL CHEMISTRY

01056-20-B

ECTS: 3,5

YEAR: 2018L

COURSE CONTENT

CLASSES:

Determination of: pKa for weak acid by the pH-metric titration method, the molar heat of neutralization of strong acid by a strong base, the Freundlich isotherm of adsorption, the isoelectric point for gelatine, the activity coefficient of copper sulphate, the dissociation constant pKa during conductometric titration of weak acid, the rate of chemical reaction and the Nernst distribution constant

LECTURES:

Surface phenomena, mechanisms of adsorption, adsorption isotherms, characteristics of selected sorbents, technological applications. Colloidal state, methods of obtainment of colloids, micelle structure, coagulation - theory and practice, electro-coagulation. Aggregates, agglomerates and flocs, electrokinetic phenomena, sedimentation. Introduction to chemical kinetics. Electrolytic conductance, conductometry; ion mobility, ionic strength. Introduction to electrochemistry. Electrochemical potential, electrodes and cells, electrochemical corrosion, analytical methods based on electrolysis.

EDUCATIONAL OBJECTIVE:

Knowledge and understanding of basic phenomena and physico-chemical processes occurring in the biosphere. Acquisition of independent research ability for selected physicochemical parameters representing components or supplementing instrumental analysis of water and soil. Mastery of mathematical and statistical methods of measurement data and analysis of the causes of errors in the measurements. Shaping teamwork skills while maintaining safety rules.

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

Codes of learning outcomes in a major field of study:

P2A_K01+, P2A_K06+, P2A_U01+, P2A_U06+, P2A_W01+, P2A_W07+, R2A_K01+, R2A_K02+, R2A_K06+, R2A_U01+, R2A_U04+, R2A_U05+, R2A_W01+, R2A_W05+,

Codes of learning outcomes in a major area of study:

K2A_K01+, K2A_K02+, K2A_K06+, K2A_K09+, K2A_U01+, K2A_U04+, K2A_U05+, K2A_W01+, K2A_W04+, K2A_W05+,

LEARNING OUTCOMES:

Knowledge

W1 - The student has knowledge of the physical and chemical processes in the environment and the mechanisms of electrode potential generation. He/she knows the phenomena occurring at the interfaces and in colloidal systems in relation to the phenomena observed in water and soil. The student knows the methodology of measuring physicochemical parameters and can plan a series of measurements for statistical and mathematical data processing.

W2 - The student knows the methodology of measuring physicochemical parameters and can plan a series of measurements for statistical and mathematical data processing.

Skills

U1 - The student is able to analyse the measurement data obtained and interpret them using various literature data.

U2 - Student is able to adapt and use the known methods of testing physical and chemical parameters in the study of environmental protection.

Social competence

K1 - The student demonstrates responsibility for risk assessment at the workplace and takes care to maintain order.

K2 - The student has the ability to responsibly perform tasks for measuring research and can effectively work in a group, both at the stage of experimental research and the development of measurement data. He/she understands the need to constantly improve skills.

BASIC LITERATURE

1) 1) Smoczyński L., Kalinowski S., Wasilewski J., Karczyński F., , Podstawy chemii fizycznej z ćwiczeniami, wyd. UWM Olsztyn, 2000 ; 2) Pigoń K., Ruziewicz Z., Chemia fizyczna , wyd. PWN Warszawa, 2008 ; 3) Atkins P.W, Podstawy chemii fizycznej, wyd. WN PWN, 2002

SUPPLEMENTARY LITERATURE

Course / module

Physical chemistry

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: mandatory

Course group: B - przedmioty kierunkowe

ECTS code: 01056-20-B

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

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: 30, Lecture: 15

Teaching forms and methods

Laboratory classes(K1, K2, U1, U2, W2) : Laboratory exercises - individual performance of selected experiments and physicochemical measurements., Lecture(K2, U2, W1) : Prezentacja multimedialna dziedziny zagadnień z chemii fizycznej.

Form and terms of the verification results:

LABORATORY CLASSES: Colloquium test - The reports of the exercises, the practical performance and pass of all the exercises, passing all tests to a positive grade.(K2, U1, U2, W2) ;LECTURE: Competention test - Competency test - on the basis of the test and presence at lectures.(K1, U2, W1)

Number of ECTS points: 3,5

Language of instruction: polski

Introductory courses:

General chemistry, mathematics, physics

Preliminary requirements:

Knowledge of basics of general and inorganic chemistry

Name of the organizational unit offering the course:

Katedra Chemii,

Person in charge of the course:

prof. dr hab. Lech Smoczyński,

Course coordinators:

Notes:

-

Detailed description of the awarded ECTS points - part B

01056-20-B
ECTS:3,5
YEAR: 2018L

PHYSICAL CHEMISTRY

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: laboratory classes	30 h
- participation in: lecture	15 h
- consultation	4 h
	49 h

2. Student's independent work:

- drawing up exercises reports	9 h
- preparation for exam	16,5 h
- preparation for tests	13 h
	38,5 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 87,5 h : 25 h/ECTS = 3,50 ECTS

average: **3,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	1,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	1,54 ECTS points,



Course / module syllabus - part A

SAFETY AND HYGIENE AT WORK

01056-29-O

ECTS: 0,5

YEAR: 2018L

COURSE CONTENT
CLASSES:

LECTURES:

Occupational health and safety regulations (Constitution of the Republic of Poland, Labor Code, Regulation of the Minister of Science and Higher Education of 5 July 2007 on occupational health and safety in universities). Identification and evaluation of life and health hazards in different fields of study (dangerous, harmful and unpleasant factors). Causes and circumstances of accidents involving university students. Procedures for handling accidents and emergencies at university (e.g. fire). First aid procedures and the first aid kit. The training addresses the specific needs of different study fields and identifies the potential threats in those environments.

EDUCATIONAL OBJECTIVE:

The aim of education is to provide basic information on the general rules of conduct in the event of an accident during learning and in situations of danger, circumstances and causes of student accidents, rules for first aid in the event of an accident, as well as potential threats that students may encounter.

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: P2A_K06+, P2A_W09+, R2A_U07+,

Codes of learning outcomes in a major area of study: K2A_K09+, K2A_U07+, K2A_W12+,

LEARNING OUTCOMES:

Knowledge

W1 - The student is familiar with the procedures for handling accidents and emergencies at university, the causes and circumstances of accidents involving university students and first aid procedures.

Skills

U1 - The student safely handles dangerous and harmful substances and materials and is familiar with occupational safety requirements. The student uses personal protection equipment and rescue equipment. The student gives first aid.

Social competence

K1 - The student exercises caution in handling dangerous and harmful substances and materials. The student observes and promotes the observance of occupational health and safety regulations by others. The student is responsible for occupational health and safety in his/her environment. The student participates in emergency procedures.

BASIC LITERATURE

1) -, 1. Ustawa z dnia 27 lipca 2005r. z późniejszymi zmianami, Prawo o szkolnictwie wyższym, 2. Rozporządzenie Ministra Nauki i Szkolnictwa Wyższego z dnia 5 lipca 2007r. w sprawie bezpieczeństwa i higieny pracy w uczelniach, 3. Nauka o pracy – bezpieczeństwo, higiena, ergonomia pod redakcją naukową pro. wyd. -, -

SUPPLEMENTARY LITERATURE

Course / module

Safety and hygiene at work

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: mandatory

Course group: O - przedmioty kształcenia ogólnego

ECTS code: 01056-29-O

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 1

Type of course:

Lecture

Number of hours per semester/week: Lecture: 4

Teaching forms and methods

Lecture(K1, U1, W1) :

Form and terms of the verification results:

LECTURE: Part in the discussion - Presence at the lecture(K1, U1, W1)

Number of ECTS points: 0,5

Language of instruction: polski

Introductory courses:

Lack

Preliminary requirements:

Lack

Name of the organizational unit offering the course:

Katedra Agrotechnologii, Zarządzania Produkcją Rolniczą i Agrobiznesu,

Person in charge of the course:

prof. dr hab. inż. Krzysztof Jankowski,

Course coordinators:

Notes:

Detailed description of the awarded ECTS points - part B

01056-29-O
ECTS:0,5
YEAR: 2018L

SAFETY AND HYGIENE AT WORK

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: lecture	4 h
- consultation	0 h
	4 h

2. Student's independent work:

- preparation for classes / studying literature	8,5 h
	8,5 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 12,5 h : 25 h/ECTS = 0,50 ECTS
average: **0,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,16 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,34 ECTS points,



SOIL BIOCHEMISTRY

01056-29-B

ECTS: 3

YEAR: 2018L

COURSE CONTENT
CLASSES:

Preparation of the soil material to determine the enzyme activity. Determination of dehydrogenase activity. Determination of catalase activity. Determination of the activity of acid phosphatase and alkaline phosphatase. Determination of the activity of β -glucosidase. Determination of the activity of arylsulfatase. Determination of urease activity. Determination of ammonifying activity. Determination of nitrification activity. Remediation of contaminated soils. Biochemical processes occurring on a waste landfill. Biochemical processes occurring during wastewater treatment. Bioleaching as a method for the recovery of heavy metals from waste. Biochemical transformation of organic matter in the process of composting and for storage of natural fertilizers. Calculation of biochemical indicators of soil quality.

LECTURES:

Biochemical processes in the environment. Glycolysis and gluconeogenesis. Krebs cycle. Pentosephosphate pathway. Glyoxylic cycle. Energy balance of biochemical transformations. Characteristics of soil enzymes. Resolution of organic compounds in the soil. Synthesis of humic acids (humus). Proteolysis and ammonification in different environments. Nitrification and denitrification. Desulphurisation and oxidation of sulphur. Oxidation and reduction of other elements, present varying degrees of oxidation. Methane fermentation. Biochemical decomposition of mineral and organic impurities. The correlation between the biochemical activity and the quality of the soil.

EDUCATIONAL OBJECTIVE:

The aim of the course is to acquaint students with the basic biochemical processes occurring in soil and methods of determining the activity of selected soil enzymes.

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:	P2A_K02+, P2A_K04+, P2A_U01+, P2A_U04+, P2A_W01+, R2A_K02+, R2A_K04+, R2A_U04+, R2A_U05+, R2A_W01+, R2A_W05+,
Codes of learning outcomes in a major area of study:	K2A_K02+, K2A_K04+, K2A_U04+, K2A_U05+, K2A_W01+, K2A_W05+,

LEARNING OUTCOMES:

Knowledge

W1 - Properly draws conclusions from the results of biochemical analyzes of the soil.
W2 - Distinguishes important enzymes participating in the metabolism of carbon, nitrogen, sulphur and phosphorus.

Skills

U1 - Constructs a simple biochemical indicator of soil fertility.
U2 - Analyzes the activity of enzymes and biochemical processes.

Social competence

K1 - Recognizes the importance of biochemical assays in estimating soil quality.
K2 - Has the ability to work independently and in a team in biochemistry.

BASIC LITERATURE

1) Paul E.A., Clark F.E., "Mikrobiologia i biochemia gleb", wyd. UMCS Lublin, 2000, t. -, s. 400.; 2) Kucharski J., Wyszowska J., "Ćwiczenia z biochemii gleby", wyd. Zakład Poligraficzny Uniwersytetu Warmińsko-Mazurskiego w Olsztynie, 2005, t. -, s. 74.; 3) Burns R.G., Dick R.P., "Enzymes in the Environment", wyd. Word Wide Web., 2002, t. -, s. 614.

SUPPLEMENTARY LITERATURE

1) Berg J.M., Stryer L., Tymoczko J.L., "Biochemia", wyd. Wyd. Naukowe PWN, 2009, t. -, s. 974.; 2) Alef K., Nannipieri P., "Methods in Applied Soil Microbiology and Biochemistry", wyd. Academic Press., 1998, t. -, s. 576.

Course / module

Soil biochemistry

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: mandatory

Course group: B - przedmioty kierunkowe

ECTS code: 01056-29-B

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

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: 30, Lecture: 15

Teaching forms and methods

Laboratory classes(K1, K2, U1, U2, W1, W2) : LABORATORY CLASSES - perform of biochemical analysis, Lecture(U1, W1, W2) : MULTIMEDIA LECTURE, information lecture.

Form and terms of the verification results:

LABORATORY CLASSES: Write-up - Evaluation of the work and cooperation in the group and subgroups.(K2) ; All biochemical analysis must be correctly summarized and correctly interpreted.(K1, K2, U2) ;LECTURE: Colloquium test - Written test - 5 questions. The assessment of sufficient - at least 60% correct answers to each question.(U1, W1, W2)

Number of ECTS points: 3

Language of instruction: polski

Introductory courses:

lack

Preliminary requirements:

lack

Name of the organizational unit offering the course:

Katedra Mikrobiologii,

Person in charge of the course:

dr inż. Magdalena Zaborowska,

Course coordinators:

Notes:

Zajęcia laboratoryjne mogą odbywać się maksymalnie w 16 osobowych grupach.

Detailed description of the awarded ECTS points - part B

01056-29-B
ECTS:3
YEAR: 2018L

SOIL BIOCHEMISTRY

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: laboratory classes	30 h
- participation in: lecture	15 h
- consultation	2 h
	47 h

2. Student's independent work:

- preparation for classes	5 h
- preparation for test	10 h
- preparation of reports of the classes	13 h
	28 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 75 h : 25 h/ECTS = 3,00 ECTS
average: **3 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	1,88 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	1,12 ECTS points,



01956-20-D

ECTS: 3

YEAR: 2018L

SPECIAL SEMINAR FOR BECHELOR DEGREE STUDENTS**COURSE CONTENT
CLASSES:**

Individual and group work of diploma students: presentation of the selected issues based on the literature. Review of the literature related to the aquatic ecosystem specific issues. Compilation of the information on environmental problems of water ecosystems required for the issues for final exam. Methodology of research within the scope of environmental protection and management. Methodology of master thesis structure (chapters, subchapters, references etc.). Selection of the problem being a subject of M.Sc. thesis. Presentation of the range of methods applied. Writing and graphical skills. Interpretation and verification of the study outcomes, confrontation with the literature. Formulation of conclusions and inferences.

LECTURES:

-

EDUCATIONAL OBJECTIVE:

Preparation of the student to prepare a master's degree thesis and to pass the final examination. The aim of the education is preparation of a diploma student to the research and creative approach of solving water-related problems, including perception and verbalization of water pollution, ecosystem services and management, formulating scientific hypotheses, ability to logical and efficient selection of materials and methods, literature, applying statistics, logical presentation of research outcomes and effective discussion.

**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: P2A_K01+, P2A_K04+, P2A_K05+, P2A_K07+, P2A_U01+, P2A_U09+, P2A_U10+, P2A_W01+, P2A_W03+, P2A_W04+, R2A_K01+, R2A_K05+, R2A_K07+, R2A_U01+, R2A_U08+, R2A_U09+, R2A_W04+, R2A_W06+,

Codes of learning outcomes in a major area of study: K2A_K01+, K2A_K07+, K2A_K10+, K2A_U01+, K2A_U08+, K2A_U09+, K2A_W06+, K2A_W13+,

LEARNING OUTCOMES:**Knowledge**

W1 - The student has knowledge of scientific methodologies. She/he possesses knowledge concerning the most important problems in the field of water resource protection and development. Knows and understands the methodology principles of research work. She/he is familiar with statistical analyses of the results and properly formulates conclusions. The student knows the methodology and rules of master thesis preparation, the basic principles of copyright law and protection of intellectual property and work safety regulations.

Skills

U1 - The student is able to apply the methodological principles in his/her research work. She/he is familiar with statistical analyses to properly analyse the results and infer conclusions.
U2 - The student skilfully complies and interprets the results of the research outcomes and compares them with the literature.

Social competence

K1 - The student is prepared for research work and understands the need for constant life-long learning.
K2 - She/he has got the ability to plan, inspire, work in groups. She/he is able to use the achieved knowledge in teamwork following legal and ethical principles.

BASIC LITERATURE

1) Glatthom, A.A., Writing the winning thesis or dissertation: A step-by-step guide. , wyd. Thousand Oaks,, 2005 ; 2) Brown, R. , Doing your dissertation in business and management: The reality of researching and writing. , wyd. SAGE, 2006

SUPPLEMENTARY LITERATURE

1) Varia, Relevant literature/ articles published in enviornmental engineering , wyd. varia, 200x

Course / module

Special seminar for bechelor degree students

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: facultative**Course group:** D - przedmioty specjalizacyjne**ECTS code:** 01956-20-D**Field of study:** Environmental Protection**Specjalty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/ masters**Year/Semester:** 1 / 1**Type of course:**

Diploma seminar

Number of hours per semester/week: Diploma seminar: 45**Teaching forms and methods**

Diploma seminar(null) : Presentation, multimedia presentation, analysis of papers and presentations, discussion.

Form and terms of the verification results:

DIPLOMA SEMINAR: Evaluation of the work and cooperation in the group - Evaluation of presentations, speeches and activities in discussion.(K1, K2, U1, U2, W1) ;DIPLOMA SEMINAR: Presentation - Presentation (literature analysis, multimedia, oral) - Substantive evaluation of content and presentation.(U1, U2, W1)

Number of ECTS points: 3**Language of instruction:** polski**Introductory courses:**

-

Preliminary requirements:

-

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształowania Środowiska,

Person in charge of the course:

prof. dr hab. inż. Katarzyna Glińska-Lewczuk,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

01956-20-D
ECTS:3
YEAR: 2018L

SPECIAL SEMINAR FOR BECHELOR DEGREE STUDENTS

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: diploma seminar	45 h
- consultation	0 h
	45 h

2. Student's independent work:

- collection and analysis of literature	15 h
- preparing speeches and presentations	15 h
	30 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 75 h : 25 h/ECTS = 3,00 ECTS
average: **3 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	1,80 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	1,20 ECTS points,



01056-29-A

ECTS: 3

YEAR: 2018L

STATISTICS AND MODELING IN ENVIRONMENTAL SCIENCES

COURSE CONTENT
CLASSES:

Probability analysis and basic measures of combinatorics. Statistical analysis of environmental data samples. Random environmental variables. Estimations and testing. Regression analysis and simple correlation. ANOVA for Completely Randomized Design (CRD). ANOVA for Randomized Block Design (RBD). Multi-factor ANOVA. Interpreting interactions. Statistical conclusion validity. Testing differences between means. Multiple regression and multivariate analysis methods. The chi-square test.

LECTURES:

A review of basic concepts in probability and statistics. Descriptive statistics and analysis of environmental data on the basis of random sample. Random variables and their distributions. Parameter estimation, confidence intervals, hypotheses and tests of significance. Deterministic and probabilistic models. Simple regression and correlation - Pearson and Spearman's correlation coefficient. Mathematical model of ANOVA and assumptions of analysis. Experimental design and ANOVA model. Tests of significance in ANOVA and mean comparisons. Transformation of environmental data. Simple and multiple regression models. Modelling methods and multivariate testing. Non-parametric hypotheses – chi-square test.

EDUCATIONAL OBJECTIVE:

Development of statistical knowledge. Acquisition of principles of natural phenomena modelling

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

Codes of learning outcomes in a major field of study: P2A_U01+, P2A_W06+, R2A_K05+, R2A_U01+,

Codes of learning outcomes in a major area of study: K2A_K05+, K2A_U01+, K2A_W10+,

LEARNING OUTCOMES:

Knowledge

W1 - The student presents in-depth knowledge in the field of statistics; understands the issue of mathematical modelling in environmental sciences; knows the methods of statistical analysis, is able to interpret the results to be used directly in practice

Skills

U1 - The student comprehensively analyses problems affecting the environmental conditions through a proper configuration of the predictive environmental variables and output data in models as well as shows knowledge of the application and exploitation. He/she is able to match and modify typical applications appropriate to natural resources based on mathematical models; is able to perform statistical analyses within the adequate model with the support of IT tools

Social competence

K1 - The student is able to forecast effects of activities in the environment

BASIC LITERATURE

1) Gołaszewski J. Puzio-Idźkowska M., Stawiana-Kosiorek A., Załuski D., Statystyka dla przyrodników z przykładami i zadaniami, wyd. UWM Olsztyn, 2003, s. 129; 2) Łomniski A., Wprowadzenie do statystyki dla przyrodników, wyd. PWN Warszawa, 1999, s. 282; 3) Kala R., Statystyka dla przyrodników, wyd. AR Poznań, 2005, s. 231

SUPPLEMENTARY LITERATURE

Course / module

Statistics and modeling in environmental sciences

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: mandatory

Course group: A - przedmioty podstawowe

ECTS code: 01056-29-A

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 1

Type of course:

Lecture, Computer classes

Number of hours per semester/week: Lecture: 15, Computer classes: 30

Teaching forms and methods

Lecture(K1, U1, W1) : , Computer classes(K1, U1, W1) : Auditor exercises - Solving tasks and analyzing results

Form and terms of the verification results:

COMPUTER CLASSES: Colloquium test - Written test 1 - solving tasks and analyzing results(K1, U1, W1) ;COMPUTER CLASSES: Colloquium test - Written test 2 - solving tasks and analyzing results(K1, U1, W1)

Number of ECTS points: 3

Language of instruction: polski

Introductory courses:

-

Preliminary requirements:

Knowledge of computer tools and statistics

Name of the organizational unit offering the course:

Katedra Hodowli Roślin i Nasiennictwa,

Person in charge of the course:

prof. dr hab. inż. Janusz Gołaszewski,

Course coordinators:

Notes:

Detailed description of the awarded ECTS points - part B

01056-29-A
ECTS:3
YEAR: 2018L

STATISTICS AND MODELING IN ENVIRONMENTAL SCIENCES

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: computer classes	30 h
- participation in: lecture	15 h
- consultation	2 h
	47 h

2. Student's independent work:

- preparation for classes	14 h
- preparation for tests	14 h
	28 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 75 h : 25 h/ECTS = 3,00 ECTS
average: **3 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	1,88 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	1,12 ECTS points,



14356-26-C

AQUATIC ECOSYSTEM PROTECTION - COST BENEFIT ANALYSIS

ECTS: 1,5

YEAR: 2019Z

COURSE CONTENT
CLASSES:

Stages of Analysis of costs and benefits of investment projects: defining and defining objectives, project identification, feasibility and alternative solutions analysis, financial analysis, economic analysis, multi-criteria analysis, sensitivity and risk analysis. Example of a project.

LECTURES:

Theoretical and practical sources of the cost-benefit analysis. Economy of well-being. Rationality and economic efficiency and effectiveness. Main problems in the methodology of cost-benefit analysis in the context of the natural environment. Stages of the cost-benefit analysis in the valuation of the natural environment. Methods valorisation of the natural environment and their application.

EDUCATIONAL OBJECTIVE:

The basic aim of education is to provide theoretical knowledge and presentation of practical tools used to carry out a cost-benefit analysis of investment and protective projects. In principle, a cost-benefit analysis should show whether a given venture will lead to an increase in the welfare of the affected community. A broadly understood socio-economic cost-benefit analysis should take into account not only the financial costs and benefits expressed in cash flows, but also provide information on those aspects of the project's impact that are not subject to market transactions. Such aspects are characteristic primarily for public goods, including the natural environment.

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

Codes of learning outcomes in a major field of study:

InzA_K02+, InzA_U03++, InzA_U04++, InzA_U06++, InzA_W04+++, P2A_K02+, P2A_K03+, P2A_K04+++, P2A_K05+, P2A_K07+, P2A_K08+, P2A_U01++, P2A_U03+++, P2A_U04+, P2A_U05+, P2A_U06++, P2A_U07+, P2A_W01+, P2A_W03+, P2A_W08+++, R2A_K02+, R2A_K03+, R2A_K04+++, R2A_K05+, R2A_K06+, R2A_K07+, R2A_K08+, R2A_U01+++, R2A_U03+, R2A_U04+, R2A_U07++, R2A_W02+++, R2A_W06+, R2A_W07+

Codes of learning outcomes in a major area of study:

K2A_K02+, K2A_K03+, K2A_K04+++, K2A_K06+, K2A_K07+, K2A_K08+, K2A_K10+, K2A_U01++, K2A_U03+++, K2A_U04+++, K2A_U07++, K2A_U15+++, K2A_W02+++, K2A_W06+, K2A_W15+++

LEARNING OUTCOMES:

Knowledge

W1 - Defines elementary concepts related to the cost-benefit analysis

W2 - Student knows about the possibilities and limitations of the method of costs and benefits in the field of valuation of the natural environment

W3 - Defines the factors determining the specificity of pro-ecological investments

Skills

U1 - He knows the procedure for assessing the effectiveness and rationality of projects in the protection of aquatic ecosystems

U2 - He can make an assessment of the economic effectiveness of investments on the example of a project in the field of water and sewage management

Social competence

K1 - Is aware of the need to protect aquatic ecosystems

K2 - He can communicate and discuss expressing his opinions

BASIC LITERATURE

1) Foltyn-Zarychta M., Analiza kosztów-korzyści w ocenie efektywności inwestycji proekologicznych, wyd. Wyd. Akademii Ekonomicznej w Katowicach, 2008, s. 191; 2) Czaja S., Becla A., Zielińska A., Analiza kosztów-korzyści w wycenie środowiska przyrodniczego, wyd. Difin, 2012, s. 162; 3) Komisja Europejska, Analiza kosztów i korzyści projektów inwestycyjnych: Przewodnik, wyd. Komisja Europejska, 2003, s. 163; 4) Komisja Europejska, Przewodnik do ANALIZY KOSZTÓW I KORZYŚCI projektów inwestycyjnych, wyd. Komisja Europejska, 2008, s. 294

SUPPLEMENTARY LITERATURE

Course / module

Aquatic Ecosystem Protection - Cost Benefit Analysis

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: facultative

Course group: C - przedmioty specjalnościowe

ECTS code: 14356-26-C

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 2

Type of course:

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 10, Auditorium classes: 15

Teaching forms and methods

Lecture(K1, K2, U1, U2, W1, W2, W3) :
Lecture with multimedia presentation, seminar, Auditorium classes(null) : Auditorial, informative, practical, workshop exercises, case analysis, discussion, project

Form and terms of the verification results:

LECTURE: Colloquium test - Written test(K1, U1, U2, W1, W2, W3) ;AUDITORIUM CLASSES: Colloquium test - Written test(K1, U1, U2, W1, W2, W3) ;AUDITORIUM CLASSES: Project - Cost-benefit analysis of an exemplary project(K1, K2, U1, U2, W1, W2, W3)

Number of ECTS points: 1,5

Language of instruction: polski

Introductory courses:

Economics of environmental protection, Environmental impact assessment

Preliminary requirements:

knowledge of economic and social-environmental processes and phenomena, sustainable development

Name of the organizational unit offering the course:

Katedra Agrotechnologii, Zarządzania Produkcją Rolniczą i Agrobiznesu,

Person in charge of the course:

dr inż. Adam Pawlewicz,

Course coordinators:

Notes:

Detailed description of the awarded ECTS points - part B

14356-26-C AQUATIC ECOSYSTEM PROTECTION - COST BENEFIT ANALYSIS
ECTS:1,5
YEAR: 2019Z

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	10 h
- consultation	2 h
	27 h

2. Student's independent work:

-	9 h
-	6 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,

**AQUATIC ECOSYSTEMS IN SPATIAL MANAGEMENT****02056-29-C****ECTS: 1,5****YEAR: 2019Z****COURSE CONTENT****CLASSES:**

Discussion on the basic design principles of waterside areas development. Overview of good practices of waterside area development in selected countries.

LECTURES:

Aquatic ecosystems and wetlands – introduction. Spatial planning of waterside areas - case studies. Principles of waterside area development and environmental impact assessment of selected investments. The influence of selected elements of spatial development on aquatic ecosystems. Proposed reduction and prevention solutions of spatial development negative impact on the environment.

EDUCATIONAL OBJECTIVE:

Acquiring skills in designing waterside areas. Presenting landscape values of selected types of aquatic ecosystems. Understanding the role of spatial planning in the protection of aquatic ecosystems.

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: R2A_K04+, R2A_K05+, R2A_U01++, R2A_W03+, R2A_W05+, R2A_W07+,

Codes of learning outcomes in a major area of study: K2A_K04+, K2A_K10+, K2A_U01+, K2A_U15+, K2A_W14+, K2A_W15+, K2A_W16+,

LEARNING OUTCOMES:**Knowledge**

- W1 - Students are introduced to good practices in waterside area development.
- W2 - The students knows the rules of waterside areas development.
- W3 - The student knows the role of spatial planning in protection of waterside areas.

Skills

- U1 - Students acquire the ability to design waterside areas.
- U2 - Students are able to obtain and analyse the data necessary to design these areas.

Social competence

- K1 - Students appreciate landscape variety related to the presence of a body of water.
- K2 - Students understand the need for protection of aquatic ecosystems.

BASIC LITERATURE

- 1) George Michael R., Managed aquatic ecosystems, wyd. Amsterdam, 1987

SUPPLEMENTARY LITERATURE

- 1) praca zbiorowa, Czasopismo: Landscape architecture, wyd. Wydawnictwo UP we Wrocławiu, .

Course / module

Aquatic Ecosystems in Spatial Management

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: facultative**Course group:** C - przedmioty specjalnościowe**ECTS code:** 02056-29-C**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/ masters**Year/Semester:** 1 / 2**Type of course:**

Lecture, Project classes

Number of hours per semester/week: Lecture: 10, Project classes: 15**Teaching forms and methods**

Lecture(K1, K2, U1, U2, W1, W2, W3) : Lecture with presentation, discussion, outdoor activities, Project classes(K1, K2, U1, U2, W1, W2, W3) : Practical classes - Individual work and teamwork, discussion.

Form and terms of the verification results:

LECTURE: Part in the discussion - Class activity(K1, K2, U1, U2, W1, W2, W3) ;PROJECT CLASSES: Project - Grading - design concept and presentation(K1, K2, U1, U2, W1, W2, W3)

Number of ECTS points: 1,5**Language of instruction** polski**Introductory courses:**

Ecology, environmental protection

Preliminary requirements:

Knowledge of basic information about the aquatic ecosystems

Name of the organizational unit offering the course:

Katedra Architektury Krajobrazu,

Person in charge of the course:

dr inż. Mariusz Antolak,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

02056-29-C
ECTS:1,5
YEAR: 2019Z

AQUATIC ECOSYSTEMS IN SPATIAL MANAGEMENT

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: project classes	15 h
- participation in: lecture	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparing presentation and project	15 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,

**AQUATIC ECOSYSTEMS IN THE LANDSCAPE****02056-29-C****ECTS: 1,5****YEAR: 2019Z****COURSE CONTENT
CLASSES:**

Discussion of the basic design principles of educational paths next to the bodies of water in relations to the issues of environmental protection. Overview of good practices of tourism development in the legally protected waterside areas in selected countries.

LECTURES:

Definitions, types and kinds of landscapes. Contemporary transformations of waterside landscapes in selected countries. Hydrogenic landscapes - spatial structure and its functioning. Aquatic ecosystems in the city, countryside and in the open landscape. Modern systems of water retention in the city – ecological subdivisions. Good practices in waterside area development - presentation of selected facilities. Possibilities of using selected aquatic ecosystems for the development of tourism and recreation.

EDUCATIONAL OBJECTIVE:

Presentation of the landscape values of selected types of aquatic ecosystems. Acquiring skills in designing educational paths in the vicinity of natural water reservoirs.

**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: P2A_K04++, P2A_U01+, P2A_W05+, R2A_W07+,

Codes of learning outcomes in a major area of study: K2A_K04+, K2A_K10+, K2A_U01+, K2A_W11+, K2A_W15+,

LEARNING OUTCOMES:**Knowledge**

W1 - The student is familiar with good practices in waterside areas development.

W2 - He or she is able to evaluate the landscape values of selected objects.

Skills

U1 - The student has acquired the ability to design educational paths. He or she is able to obtain and analyse the data necessary to design paths.

Social competence

K1 - The student appreciates landscape variety related to the presence of a body of water.

K2 - The student understands the need for protection of aquatic ecosystems.

BASIC LITERATURE

1) George Michael R., Managed aquatic ecosystems, wyd. Amsterdam, 1987

SUPPLEMENTARY LITERATURE

1) praca zbiorowa, Czasopismo: Landscape architecture, wyd. Wydawnictwo UP we Wrocławiu, ,

Course / module

Aquatic Ecosystems in the Landscape

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: facultative**Course group:** C - przedmioty specjalnościowe**ECTS code:** 02056-29-C**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/ masters**Year/Semester:** 1 / 2**Type of course:**

Lecture, Project classes

Number of hours per semester/week: Lecture: 10, Project classes: 15**Teaching forms and methods**

Lecture(K1, K2, U1, W1, W2) : Lecture (K1, K2, U1, W1, W2): Lecture with presentation, discussion, study trip, Project classes(null) : Design exercises (K1, K2, U1, W1, W2): Individual work and teamwork, discussion

Form and terms of the verification results:

LECTURE: Part in the discussion - Evaluation of activity(K1, K2, U1, W1, W2) ;PROJECT CLASSES: Project - Design concept of educational path(K1, K2, U1, W1, W2) ;PROJECT CLASSES: Presentation - Preparation of presentation about aquatic ecosystems(K1, K2, U1, W1, W2)

Number of ECTS points: 1,5**Language of instruction** polski**Introductory courses:**

Ecology, environmental protection

Preliminary requirements:

Knowledge of basic information about the aquatic ecosystems and landscape

Name of the organizational unit offering the course:

Katedra Architektury Krajobrazu,

Person in charge of the course:

dr inż. Mariusz Antolak,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

02056-29-C
ECTS:1,5
YEAR: 2019Z

AQUATIC ECOSYSTEMS IN THE LANDSCAPE

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: project classes	15 h
- participation in: lecture	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparation of presentation and project	15 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,



01956-26-C

ECTS: 1,5

YEAR: 2019Z

BIOTECHNOLOGICAL PROCESSING OF ORGANIC WASTES**COURSE CONTENT****CLASSES:**

Occupational health and safety principles and regulations applicable to students participating in classes. Environmental toxicology – basic terms. Determination of the degree of water contamination with selected substances, using Algaltoxkit, Daphtoxkit and Lemna Tests. Determination of morphological and physiological changes in higher plants emerging as a result of pollution in the soil environment, using Phytotoxkit. The effect of substrate pollution on the chlorophyll content in selected plants. Rapidtoxkit – a test for determining herbicides in water. Determining chlorinated hydrocarbons in rapeseed oil. Detecting nitrates and nitrites in water and food. Determination of the presence of salicylates in bodily fluids.

LECTURES:

Toxicology in contemporary science and its extent. Toxic substances in the natural environment. Factors affecting the toxicity of xenobiotics. Toxicological and ecotoxicological evaluation of crop protection chemicals. Characteristics of methods used in evaluation of environmental pollution. Biomonitoring of environmental pollution (types of biomonitoring, bioindication and bioindicators). Methods for conducting research with the use of biotests. A choice of biotests. Biotests in evaluation of the environmental condition. Biological fluids as a source of information of human exposure to environmental chemical factors. Legal regulations concerning biotests.

EDUCATIONAL OBJECTIVE:

Acquainting students with hazardous substances in the environment and biotests used to evaluate the natural environment contaminated with various compounds.

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:

InzA_K01+, InzA_U02+, InzA_U05+, InzA_U08+, P2A_K01+, P2A_K02+, P2A_U01+, P2A_U04+, P2A_U06+, P2A_U07+, P2A_W01+, P2A_W03+, R2A_K01+, R2A_K02+, R2A_K05+, R2A_U04+, R2A_U05+, R2A_U06+, R2A_W05+,

Codes of learning outcomes in a major area of study:

K2A_K01+, K2A_K02+, K2A_K05+, K2A_U04+, K2A_U05+, K2A_U06+, K2A_W05+, K2A_W06+,

LEARNING OUTCOMES:**Knowledge**

W1 - The student has in-depth knowledge concerning basic contaminants, their impact on the environment, their effects on living organisms and their consequences.

W2 - The student can choose a method for rapid detection of pollution in the environment.

Skills

U1 - The student knows how to select and use chemical and biological methods and how to interpret results.

U2 - The student knows how to identify, detect and evaluate risks resulting from the presence of toxic compounds in the environment and is able to make decisions.

U3 - The student independently determines the effective concentration of selected toxic compounds in relation to various bioindicators.

Social competence

K1 - The student understands the need for learning.

K2 - The student is able to cooperate and work in a group.

K3 - The student is aware of the responsibility for the condition of the environment.

BASIC LITERATURE

1) Sikorski Ł., Adomas B., Biotesty w badaniach toksykologicznych i ekotoksykologicznych, wyd. PAN, 2010, t. t. 4, s. 119-129; 2) Seńczuk W., Toksykologia współczesna, wyd. PZWL Warszawa, 2005 ; 3) Manahan S. E., Toksykologia środowiska. Aspekty chemiczne i biochemiczne, wyd. PWN Warszawa, 2006 ; 4) Laskowski R., Migula P., Ekotoksykologia, wyd. PWRiL Warszawa, 2004 ; 5) Traczewska T.M., Biologiczne metody oceny skażenia środowiska, wyd. PW Wrocław, 2011 ; 6) Adomas B., Murawa D., Ćwiczenia z toksykologii środowiska, wyd. UWM Olsztyn, 2006 ; 7) Rejmer P., Podstawy ekotoksykologii, wyd. Ekoinżynieria Lublin, 1997

SUPPLEMENTARY LITERATURE**Course / module**

Biotechnological Processing of Organic Wastes

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: facultative**Course group:** C - przedmioty specjalnościowe**ECTS code:** 01956-26-C**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/ masters**Year/Semester:** 1 / 2**Type of course:**

Classes, Lecture

Number of hours per semester/week: Classes: 15, Lecture: 10**Teaching forms and methods**

Classes(K1, K2, K3, U1, U2, U3, W1, W2) : Laboratory classes., Lecture(K1, K3, U1, W1, W2) : Lecture with multimedia presentation.

Form and terms of the verification results:

CLASSES: Write-up - Reports from laboratory classes. (K1, U1, U2, U3, W2) ;CLASSES: Colloquium test - A written test with open questions.(K1, K2, K3, U1, U2, U3, W1, W2) ;LECTURE: Written test - Written test 1 - a written test with open questions.(K1, K3, U1, W1, W2)

Number of ECTS points: 1,5**Language of instruction** polski**Introductory courses:**

-

Preliminary requirements:

basic knowledge of biochemistry and plant physiology

Name of the organizational unit offering the course:

Katedra Chemii,

Person in charge of the course:

prof. dr hab. inż. Barbara Adomas,

Course coordinators:**Notes:**

Liczebność grup do 12 osób

Detailed description of the awarded ECTS points - part B

01956-26-C
ECTS:1,5
YEAR: 2019Z

BIOTECHNOLOGICAL PROCESSING OF ORGANIC WASTES

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: classes	15 h
- participation in: lecture	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparation for test of classes material	5 h
- preparation for test of lecture material	6 h
- preparing reports	4 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,

**CLIMATE VS. WATER RESOURCE MANAGEMENT****13056-29-C****ECTS: 2,5****YEAR: 2019Z****COURSE CONTENT****CLASSES:**

Performing statistical analysis on the dynamics of rainfall by type and causes. Working with climate models allowing to predict changes in the dynamics and structure of rainfall, depending on the scenarios of climate change with a focus on climate change issues

LECTURES:

Meteorology and climatology, supported by the use of geographic information systems, remote sensing, mapping and statistical methods that permit the production, analyzes and forecasts of atmospheric and hydrological processes. Water resources and their relationship with the climatic conditions, the dynamics of rivers in relation to the volatility of their power, the functioning of objects and hydraulic engineering in water management and forecasting their impact on river ecosystems, risk analysis and environmental hazards. A comprehensive explanation of the impact of processes and hydrological phenomena and weather on the environment and the various forms of human activity. Knowing weather allows decision-making in the field of water management at the community, district and region

EDUCATIONAL OBJECTIVE:

The aim of education is to demonstrate the relationship between the properties of the climate and the balance of water in time and space. The changing climate will cause a lot of consequences in this regard, which must be considered by the decision-makers responsible for water management

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

Codes of learning outcomes in a major field of study: P2A_K04+, P2A_U06+, R2A_W03+,

Codes of learning outcomes in a major area of study: K2A_K10+, K2A_U04+, K2A_W03+,

LEARNING OUTCOMES:**Knowledge**

W1 - The student possesses communicative competence, convincing and professional approach to the key issues of climate and water management in the field of environment protection and development.

Skills

U1 - The student will acquire the ability to analyse weather conditions in the context of the current and foreseeable weather systems.

Social competence

K1 - The student will acquire a competence communicative, convincing and professional approach to the key issues of climate and water management in the field of environment protection and development.

BASIC LITERATURE

1) Bates, B.; Kundzewicz, Z. W.; Wu, S.; Palutikof, J., "Climate change and water", , wyd. wyd. IPCC Technical Paper, 2008, t. VI, s. 200; 2) Arnell, N. W., "Global warming, river flows and water resources", wyd. Springer, 1996, s. 224; 3) Peter H. Gleick, "Climate change, hydrology, and water resources", , wyd. Wiley, 1989, s. 334; 4) Kożuchowski K., "Atmosfera, klimat, ekoklimat", , wyd. PWN, 1998, s. 243; 5) Woś A., "Meteorologia dla geografów", , wyd. UAM, 2008, s. 310

SUPPLEMENTARY LITERATURE**Course / module**

Climate vs. Water Resource Management

Fields of education:

Obszar nauk rolniczych, leśnych i

weterynaryjnych, Obszar nauk przyrodniczych

Course status: mandatory**Course group:** C - przedmioty specjalnościowe**ECTS code:** 13056-29-C**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/masters**Year/Semester:** 1 / 2**Type of course:**

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 15, Auditorium classes: 30**Teaching forms and methods**

Lecture(W1) : academic lecture with the multimedial presentations, Auditorium classes(K1, U1, W1) : classes laboratory

Form and terms of the verification results:

LECTURE: Colloquium test - null(K1, U1, W1); AUDITORIUM CLASSES: Write-up - null(K1, U1, W1)

Number of ECTS points: 2,5**Language of instruction** polski**Introductory courses:**

Meteorology, Climatology and Hydrology

Preliminary requirements:

Knowledge of the characteristics of meteorological and hydrological parameters

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształtowania Środowiska,

Person in charge of the course:

dr hab. inż. Ewa Dragańska,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

13056-29-C
ECTS:2,5
YEAR: 2019Z

CLIMATE VS. WATER RESOURCE MANAGEMENT

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: auditorium classes	30 h
- participation in: lecture	15 h
- consultation	2 h
	47 h

2. Student's independent work:

- preparation for test	5 h
- preparing reports	15,5 h
	20,5 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 67,5 h : 27 h/ECTS = 2,50 ECTS
average: **2,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	1,74 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,76 ECTS points,



01156-26-C

ECTS: 1,5

YEAR: 2019Z

ECOLOGICAL AGRICULTURE IN WATER PROTECTION**COURSE CONTENT****CLASSES:**

Percentage of crops cultivated in Poland and trends of change. Economic importance and site requirements of cultivated plants. Rules of tillage and crop cultivation applied in ecological farming. Selection of species and cultivars for cultivation in ecological farms. Principles of elaboration of crop rotations in ecological farming. Fertilization and fertilizers used in ecological farming. Balance of organic matter and balance of main nutrients (N, P, K) in various agricultural systems and their effects on adjacent water ecosystems. Crops nurturing in ecological farming. Time and techniques of crop harvesting used in ecological farming.

LECTURES:

Management systems used in agriculture. Distinctive features of conventional, integrated and ecological agriculture. Land use structure. Field arrangement within an ecological farm. Influence of infrastructure of surrounding areas and equipment availability as well as the kind and volume of production on protection of soil and water ecosystems. Importance of intercropping to soil and water protection. Legal regulations concerning ecological farming.

EDUCATIONAL OBJECTIVE:

Acquisition of knowledge concerning the importance of ecological farming in water ecosystem protection. Acquisition of knowledge about contemporary requirements concerning farm infrastructure, including sites for keeping farm manure.

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

Codes of learning outcomes in a major field of study:	InzA_W04+, P2A_K01+, P2A_K04+, P2A_W01+, R2A_K01+, R2A_K04+, R2A_U01+, R2A_U09+, R2A_W06+, R2A_W09+,
Codes of learning outcomes in a major area of study:	K2A_K01+, K2A_K04+, K2A_U09+, K2A_U15+, K2A_W06+, K2A_W09+,

LEARNING OUTCOMES:**Knowledge**

W1 - The student has advanced knowledge about the importance of environmental conditions and sustainable use of resources and knowledge of biodiversity at the farm level and factors that threaten the quality of the environment.

W2 - The student is able to identify and assess natural and cultural values of the landscape.

Skills

U1 - He has the ability to communicate precisely with various subjects in verbal, written and graphic forms.

U2 - He has the ability to select and modify typical activities, including agricultural technology in the field of environmental protection

Social competence

K1 - He understands the need for lifelong learning, can inspire and organize the learning process of others

K2 - Correctly identifies and resolves dilemmas related to the protection and shaping of environments.

BASIC LITERATURE

1) Tyburski J., Żakowska-Biemans S., Wprowadzenie do rolnictwa ekologicznego. , wyd. SGGW, Warszawa, 2007 ; 2) Sejm RP, USTAWA z dnia 25 czerwca 2009 r. o rolnictwie ekologicznym., wyd. Warszawa, 2009

SUPPLEMENTARY LITERATURE

1) Rada WE, Rozporządzenie Rady (WE) nr 834/2007 z dnia 28 czerwca 2007 r. w sprawie produkcji ekologicznej i znakowania produktów ekologicznych., wyd. Warszawa, 2007 ; 2) Komisja WE, Rozporządzenie Komisji (WE) nr 889/2008 z dnia 5 września 2008 r. ustanawiające szczegółowe zasady wdrażania rozporządzenia Rady (WE) nr 834/2007., wyd. Warszawa, 2008

Course / module

Ecological agriculture in water protection

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: facultative**Course group:** C - przedmioty specjalnościowe**ECTS code:** 01156-26-C**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/ masters**Year/Semester:** 1 / 2**Type of course:**

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 10, Auditorium classes: 15**Teaching forms and methods**

Lecture(K1, K2, U1, U2, W1, W2) : Lectures with Power Point presentation., Auditorium classes(null) : Lectures with Power Point presentation.

Form and terms of the verification results:

LECTURE: Written test - Written test covering lectures materials (K1, K2, U1, U2, W1, W2) ;AUDITORIUM CLASSES: Written test - Written test covering presented topics.(K1, K2, U1, U2, W1, W2)

Number of ECTS points: 1,5**Language of instruction** polski**Introductory courses:**

ecology, soil science, tillage, hydrography

Preliminary requirements:

completed first stage of university education

Name of the organizational unit offering the course:

Katedra Agroekosystemów,

Person in charge of the course:

dr hab. inż. Bogumił Rychcik,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

01156-26-C
ECTS:1,5
YEAR: 2019Z

ECOLOGICAL AGRICULTURE IN WATER PROTECTION

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	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- self-education	15 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,



ECOTOXICOLOGY

13956-29-B

ECTS: 4

YEAR: 2019Z

COURSE CONTENT
CLASSES:

Occupational health and safety principles and regulations applicable to students participating in classes. Environmental toxicology – basic terms. Plants and animals as bioindicators of air, soil and water pollution. Determining the degree of water environment pollution with selected substances with the use of bioindicators. Evaluation of morphological and physiological changes in plants resulting from environmental pollution. Determination of the content of glucose and ascorbic acid in roots of plants growing on polluted ground. Toxicology and ecotoxicology of crop protection chemicals. Preparation of samples to determine the remains of the residue of active substances of chlorinated hydrocarbons in plant material. Safety data sheets for hazardous substances. Determining toxicity indicators.

LECTURES:

Ecotoxicology in contemporary science and its extent. Selected terms in toxicology. Review of major environmental contaminants. Hazardous substances in the environment: characteristics, evaluation of ecological and health risks and their effect on landscape elements. Distribution and biotransformations of xenobiotics in the natural environment. Natural defence mechanisms against xenobiotics. Long-term effects of toxic substances. Plants and animals as bioindicators of environmental contamination. Crop protection chemicals in individual elements of the environment and agricultural produce. Selected issues in food toxicology. Medicines in the natural environment. Routes of toxic substances and their effect on populations and ecosystems. Methods of detecting environmental pollution. Chemical safety. Legal regulations of ecotoxicology.

EDUCATIONAL OBJECTIVE:

Familiarising students with harmful substances in the environment, their effects and various methods of determining those contaminations.

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

Codes of learning outcomes in a major field of study:	P2A_K01+, P2A_K02+, P2A_K05+, P2A_K07+, P2A_U01+, P2A_U04+, P2A_U06+, P2A_U07+, P2A_W01+, P2A_W02+, R2A_K01+, R2A_K02+, R2A_K05+, R2A_K07+, R2A_U04+, R2A_U05+, R2A_U06+, R2A_W01+, R2A_W03+, R2A_W05+,
Codes of learning outcomes in a major area of study:	K2A_K01+, K2A_K02+, K2A_K05+, K2A_K07+, K2A_U04+, K2A_U05+, K2A_U06+, K2A_W01+, K2A_W03+, K2A_W05+,

LEARNING OUTCOMES:

Knowledge

W1 - The student has in-depth knowledge concerning basic contaminants, their impact on the environment, effects on living organisms and consequences.

W2 - The student can choose a method for rapid detection of pollution in the environment.

W3 - The student can distinguish methods and criteria for establishing chemical safety levels.

Skills

U1 - The student knows how to select and use chemical and biological methods and how to interpret results.

U2 - The student knows how to identify, detect and evaluate risks resulting from the presence of toxic compounds in the environment and make decisions.

U3 - The student independently determines the effective concentration of selected toxic compounds in relation to various bioindicators.

Social competence

K1 - The student understands the need for learning.

K2 - The student is able to cooperate and work in a group.

K3 - The student is aware of the responsibility for the condition of the environment.

K4 - The student is also aware of the need for oriented acquisition of additional knowledge.

BASIC LITERATURE

- 1) Rejmer P., Podstawy ekotoksykologii, wyd. Ekoinżynieria Lublin, 1997 ; 2) Siemiński M., Środowiskowe zagrożenia zdrowia, wyd. PWN Warszawa, 2007 ; 3) Skrzypczak G., Praczyk T., Herbicydy, wyd. PWRiL Warszawa, 2004 ; 4) Adomas B., Murawa D., Ćwiczenia z toksykologii środowiska, wyd. UWM Olsztyn, 2006 ; 5) Laskowski R., Migula P., Ekotoksykologia, wyd. PWRiL Warszawa, 2004

SUPPLEMENTARY LITERATURE

Course / module

Ecotoxicology

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: mandatorny

Course group: B - przedmioty kierunkowe

ECTS code: 13956-29-B

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 2

Type of course:

Laboratory classes, Lecture

Number of hours per semester/week: Laboratory classes: 30, Lecture: 15

Teaching forms and methods

Laboratory classes(K1, K2, K3, K4, U1, U2, U3, W1, W2, W3) : Laboratory classes., Lecture(K1, K3, K4, U1, W1, W3) : Lecture with multimedia presentation.

Form and terms of the verification results:

LABORATORY CLASSES: Write-up - Reports from laboratory classes. (K2, U1, U2, U3, W2) ;LABORATORY CLASSES: Colloquium test - A written test with open questions.(K1, K2, K3, K4, U1, U2, U3, W1, W2, W3) ;LABORATORY CLASSES: Written test - A written test before starting class activities.(U3, W1, W2, W3) ;LECTURE: Written exam - Written examination (structured questions) - a written examination with open questions.(K1, K3, K4, U1, W1, W3)

Number of ECTS points: 4

Language of instruction: polski

Introductory courses:

Bioindicators of environmental pollution

Preliminary requirements:

Knowledge of elements of biochemistry and plant physiology

Name of the organizational unit offering the course:

Katedra Chemii,

Person in charge of the course:

prof. dr hab. inż. Barbara Adomas,

Course coordinators:

Notes:

Liczebność grup do 12 osób

Detailed description of the awarded ECTS points - part B

13956-29-B
ECTS:4
YEAR: 2019Z

ECOTOXICOLOGY

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: laboratory classes	30 h
- participation in: lecture	15 h
- consultation	4 h
	49 h

2. Student's independent work:

- preparation for entrance tests	14 h
- preparation for exam	11 h
- preparation for test	13 h
- preparing reports	13 h
	51 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 100 h : 25 h/ECTS = 4,00 ECTS
average: **4 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	1,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	2,04 ECTS points,

**ENVIRONMENTAL INFORMATION SYSTEMS****13056-20-C****ECTS:****YEAR: 2019Z****COURSE CONTENT****CLASSES:**

Raster and vector data layers and their display. Geo-references of raster layers and spatial measurements. Creating vector layers and attribute tables. Analysis of raster and vector layers. Analysis attribute tables. Spatial processing (extract, dissolve, buffer, clip, merge, intersect, union).

LECTURES:

The theory of geographic information systems (GIS). Raster and vector data layers. Attributes and databases. Analysis of raster and vector layers. Database analysis. Generate, edit and process layers. Numerical methods of processing information from aerial photographs and satellite images. Coordinate systems. DEM. Design of GIS use.

EDUCATIONAL OBJECTIVE:

General theory of GIS, the creation of spatial databases, the basic operations on the spatial data and databases.

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: P2A_U01+, P2A_U03+, P2A_U05+, P2A_W06+, R2A_K01+, R2A_K06+, R2A_K07+, R2A_U01+,

Codes of learning outcomes in a major area of study: K2A_K01+, K2A_K06+, K2A_K07+, K2A_U01+, K2A_U03+, K2A_W10+,

LEARNING OUTCOMES:**Knowledge**

W1 - Knows the theory of geographic information systems.

Skills

U1 - Can obtain information about the natural environment from various sources.

Social competence

K1 - Understands the need to use modern tools for creating and analysing spatial databases.

BASIC LITERATURE

1) Dobers E.S., Sowiński P., Wprowadzenie do systemów informacji przestrzennej, wyd. Elset, Olsztyn, 2011, s. 103; 2) Gotlib D., Iwaniak A., Olszewski R., GIS - Obszary zastosowań, wyd. Wydawnictwo Naukowe PWN, Warszawa, 2007, s. 250; 3) Iwańczak B., QGIS. Tworzenie i analiza map, wyd. Helion, Gliwice, 2016, s. 416; 4) Szczepanek R., Systemy informacji przestrzennej z Quantum GIS, wyd. Wydawnictwo Politechniki Krakowskiej, 2013, s. 136; 5) Urbański J., GIS w badaniach przyrodniczych, wyd. Centrum GIS, Uniwersytet Gdański, 2012, s. 266

SUPPLEMENTARY LITERATURE

1) Bajerowski T. (red), Podstawy teoretyczne gospodarki przestrzennej i zarządzania przestrzenią, wyd. UWM, Olsztyn, 2003, s. 244; 2) Kozak J., Pyka K., Zdjęcia lotnicze. Atlas fotointerpretacyjny, wyd. MGGP Aero, Warszawa, 2011, s. 225; 3) Longley P. A., Goodchild M. F., Maguire D. J., Rhind D. W., GIS - Teoria i praktyka, wyd. Wydawnictwo Naukowe PWN, Warszawa, 2006, s. 519

Course / module

Environmental Information Systems

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: facultative**Course group:** C - przedmioty specjalnościowe**ECTS code:** 13056-20-C**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/masters**Year/Semester:** 1 / 2**Type of course:**

Lecture, Computer classes

Number of hours per semester/week: Lecture: 10, Computer classes: 15**Teaching forms and methods**

Lecture(K1, W1) : Information lecture with a multimedia presentation., Computer classes(K1, U1) : Computer exercises, working with GIS software on raster and vector data layers.

Form and terms of the verification results:

LECTURE: Written test - Test (refill replies) checking knowledge of the content of the lecture.(K1, W1) ;COMPUTER CLASSES: Report - Reporting during each exercise.(U1) ;COMPUTER CLASSES: Colloquium practical - Student working on vector and raster datalayers provides answers to the questions in the test.(U1)

Number of ECTS points:**Language of instruction** polski**Introductory courses:**

geology, geomorphology, soils science, information technologies

Preliminary requirements:

The knowledge, skills and social competence in the field of geology, geomorphology, soils science, information technologies.

Name of the organizational unit offering the course:

Katedra Gleboznawstwa i Rekultywacji Gruntów,

Person in charge of the course:

dr hab. Paweł Sowiński,

Course coordinators:**Notes:**

Liczebność grupy ćwiczeniowej maksymalnie 12 osób.

Detailed description of the awarded ECTS points - part B

13056-20-C

ENVIRONMENTAL INFORMATION SYSTEMS

ECTS:

YEAR: 2019Z

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: computer classes	15 h
- participation in: lecture	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparation for written test	5 h
- preparing project	5 h
- preparing report of lectures material	5 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	-0,96 ECTS points,



Course / module syllabus - part A

ERGONOMICS

16056-29-O

ECTS: 0,25

YEAR: 2019Z

**COURSE CONTENT
CLASSES:****LECTURES:**

Ergonomics – basic concepts and definitions. Ergonomics as an interdisciplinary science. The main trends in ergonomics: workplace ergonomics (physical and mental effort in the workplace, adapting the workstation to specific workers and tasks, the work environment), product ergonomics – ergonomic quality engineering, ergonomics for elderly and disabled persons. Ergonomics of standing and sitting work stations.

EDUCATIONAL OBJECTIVE:

The aim of the course is to introduce students to the basic issues related to the ergonomics understood in interdisciplinary sense, awareness of threats and problems (including health) related to improper ergonomic solutions at workplaces and in non-professional life and the benefits of correct actions in this area

**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: InzA_U03+, P2A_K06+, P2A_W09+,

Codes of learning outcomes in a major area of study: K2A_K09+, K2A_U07+, K2A_W12+,

LEARNING OUTCOMES:**Knowledge**

W1 - The student is familiar with the basic concepts in ergonomics, in particular work station ergonomics.

Skills

U1 - Ability to assess (in the basic scope) conditions at work and during out-of-work activities due to ergonomic problems and related risks

Social competence

K1 - Anthropocentric attitude in relation to working and everyday life conditions, responding to threats resulting from faulty solutions and irregularities in the field of ergonomic quality; sensitizing to the needs of people with disabilities (in an ergonomic context).

BASIC LITERATURE

1) Batogowska A., Podstawy ergonomii., wyd. Wydawnictwo WSP Olsztyn, 1998 ; 2) Górka E., Ergonomia. Projektowanie, diagnoza, eksperymenty., wyd. Wydawnictwo Oficyna Wydawnicza Politechniki Warszawskiej, 2007 ; 3) Górka E., Tytyk E., Ergonomia w projektowaniu stanowisk pracy., wyd. Wydawnictwo Politechniki Warszawskiej, 1998 ; 4) Jabłoński J., Ergonomia produktu, ergonomiczne zasady projektowania produktów., wyd. Wydawnictwo Politechniki Poznańskiej, 2006

SUPPLEMENTARY LITERATURE**Course / module**

Ergonomics

Fields of education:

Obszar nauk przyrodniczych

Course status: mandatory**Course group:** O - przedmioty kształcenia ogólnego**ECTS code:** 16056-29-O**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/ masters**Year/Semester:** 1 / 2**Type of course:**

Lecture

Number of hours per semester/week: Lecture: 2**Teaching forms and methods**

Lecture(K1, U1, W1) : Credit based on active participation in the lecture.

Form and terms of the verification results:

LECTURE: Part in the discussion - null(K1, U1, W1)

Number of ECTS points: 0,25**Language of instruction:** polski**Introductory courses:**

lack

Preliminary requirements:

lack

Name of the organizational unit offering the course:

Katedra Agrotechnologii, Zarządzania Produkcją Rolniczą i Agrobiznesu,

Person in charge of the course:

prof. dr hab. inż. Krzysztof Jankowski,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

16056-29-O
ECTS:0,25
YEAR: 2019Z

ERGONOMICS

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: lecture	2 h
- consultation	0 h
	2 h

2. Student's independent work:

- reading the basic literature, acquiring knowledge related to the subject of the lecture.	5,5 h
	5,5 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 7,5 h : 25 h/ECTS = 0,30 ECTS
average: **0,25 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,08 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,17 ECTS points,



Course / module syllabus - part A

ETIQUETTE

14056-29-O

ECTS: 0,5

YEAR: 2019Z

COURSE CONTENT

CLASSES:

not applicable

LECTURES:

Basic issues on the principles of savoir-vivre everyday life (salutation, greeting, talking on the phone, the basic rules of etiquette and precedence in public places). Interpersonal relationships. Basic university etiquette (precedence, rules of correspondence). Professional etiquette (professional appearance, dress code, the rules on preparing for a job interview). Table etiquette.

EDUCATIONAL OBJECTIVE:

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

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: R2A_K01+, R2A_U04+, R2A_W08+,

Codes of learning outcomes in a major area of study: K2A_K01+, K2A_U04+, K2A_W08+,

LEARNING OUTCOMES:

Knowledge

W1 - The student knows the basic issues of the principles of the diplomatic protocol and the international label.

Skills

U1 - He can apply the principles of precedence during meetings and celebrations at various levels.

Social competence

K1 - The student is aware of the existence of cultural differences in international relations. It is open to intercultural contacts.

BASIC LITERATURE

1) Johnson D., The Little Book of Etiquette, wyd. Running Press Miniature Editions, 1997; 2) Smith J.R.R., The etiquette book. A complete guide to modern manners, wyd. Sterling, 2011; 3) Martin J.S., Chaney L.H., Global Business Etiquette: A Guide to International Communication and Customs, wyd. PRAEGER, 2012

SUPPLEMENTARY LITERATURE

1) Mitchell Ch., Short Course in International Business Culture, wyd. World Trade Press, 1999; 2) Baldrige L., New manners for new times. A complete guide to etiquette, wyd. Scribner, 2003; 3) Fox S., Etiquette For Dummies, wyd. Wiley Publishing, Inc., 2007

Course / module

Etiquette

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: mandatory

Course group: O - przedmioty kształcenia ogólnego

ECTS code: 14056-29-O

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 2

Type of course:

Lecture

Number of hours per semester/week: Lecture: 4

Teaching forms and methods

Lecture(K1, U1, W1) : Lecture with multimedia presentation and seminar components

Form and terms of the verification results:

LECTURE: Part in the discussion - A brief conversation verifying the basic rules of the field of etiquette (K1, U1, W1)

Number of ECTS points: 0,5

Language of instruction: polski

Introductory courses:

no

Preliminary requirements:

Knowledge of the basic principles of human coexistence

Name of the organizational unit offering the course:

Katedra Agrotechnologii, Zarządzania Produkcją Rolniczą i Agrobiznesu,

Person in charge of the course:

prof. dr hab. inż. Krzysztof Jankowski,

Course coordinators:

Notes:

brak

Detailed description of the awarded ECTS points - part B

14056-29-O

ETIQUETTE

ECTS:0,5

YEAR: 2019Z

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: lecture	4 h
- consultation	0 h
	4 h

2. Student's independent work:

- organizing the notes, repeating the lecture, supplementing the message with the content from the indicated literature	8,5 h
	8,5 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 12,5 h : 25 h/ECTS = 0,50 ECTS

average: **0,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,16 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,34 ECTS points,

**GRASSLANDS IN WATER PROTECTION****01956-29-C****ECTS: 1,5****YEAR: 2019Z****COURSE CONTENT
CLASSES:**

Issues related to the natural meaning of the grasslands, the requirements of the water meadow plants, the flow of nutrients in sodden areas, grasslands in the accumulation of water resources in shear flood wave, the role of grasslands in water intakes and the protection of water bodies against pollution from agricultural sources. Discussion on the issues discussed.

LECTURES:

Grasslands in Poland and in the world. The diversity of grasslands. Natural importance of grasslands. Water requirements of plant grasslands. Types of grassland depending on the water conditions in their habitat. The flow of nutrients to sodden areas. Grasslands as water reservoirs. Alluvial meadows and flood protection. Grasslands in water intakes. Grasslands and eutrophication of water bodies.

EDUCATIONAL OBJECTIVE:

Understanding the role of grasslands in water protection.

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

Codes of learning outcomes in a major field of study: P2A_W01+, R2A_K04+, R2A_U01+, R2A_W06+,

Codes of learning outcomes in a major area of study: K2A_K04+, K2A_U01+, K2A_W06+,

LEARNING OUTCOMES:**Knowledge**

W1 - She/he has knowledge of the role of grasslands in water protection

Skills

U1 - She/he identifies the effect of the presence of grassland in the catchment on water quality.

Social competence

K1 - She/he is focused on the need to protect water resources.

BASIC LITERATURE

1) Grzegorzczak S., Benedycki S., Łąkoznawstwo, wyd. UWM Olsztyn, 2001, s. ss.201

SUPPLEMENTARY LITERATURE

1) Mioduszewski W., Woda w krajobrazie rolniczym, wyd. IMUZ Falenty, 2006, s. ss.221

Course / module

Grasslands in water protection

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: facultative**Course group:** C - przedmioty specjalnościowe**ECTS code:** 01956-29-C**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/masters**Year/Semester:** 1 / 2**Type of course:**

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 10, Auditorium classes: 15**Teaching forms and methods**

Lecture(K1, W1) : Lecture with multimedia presentation, Auditorium classes(U1) : Referencing the work of students

Form and terms of the verification results:

LECTURE: Colloquium test - Multiple choice test(W1) ;AUDITORIUM CLASSES: Presentation - Presentations made by students and discussion(K1, U1)

Number of ECTS points: 1,5**Language of instruction:** polski**Introductory courses:**

-

Preliminary requirements:

-

Name of the organizational unit offering the course:

Katedra Łąkarstwa i Urządzania Terenów Zieleni,

Person in charge of the course:

prof. dr hab. Stefan Grzegorzczak,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

01956-29-C
ECTS:1,5
YEAR: 2019Z

GRASSLANDS IN WATER PROTECTION

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	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- study of literature	15 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,



HYDROBIOLOGY AND AQUATIC ECOLOGY

13056-26-C

ECTS: 2,5

YEAR: 2019Z

COURSE CONTENT

CLASSES:

Hydrobiological research methods – the main goals, sampling process in various types of freshwater habitats. Methods for assessment of water quality and trophic status based on biological indicators: saprobe system, evaluation of the ecological status of water bodies, trophic status indexes based on biomass and diversity of freshwater organisms. Assessment methods for biological production in the waters. The role of macrophytes in aquatic ecosystems, based on the assessment of the vegetation structure. Rules of phytosociological vegetation research and near-water habitats, organization of field work, preparing necessary documentation, processing of results. Preparation of hydromorphological assessment of rivers, evaluating watercourses as habitats for aquatic organisms. Mathematical models reflecting the functioning of aquatic ecosystems. Forecasting changes in water quality on the basis of succession and anthropogenic transformation of the structure of aquatic organisms.

LECTURES:

Lakes, rivers, ponds and reservoirs as a habitat for organisms. Biodiversity of aquatic ecosystems. Complexes of organisms inhabiting different types of waters: plankton, benthos, periphyton, nekton, neuston and pleuston. The relationship between habitat type and biocenosis in aquatic environments. The main physical and chemical factors affecting aquatic organisms. Circulation of matter and energy in aquatic ecosystems. Biological production, conditions and abundance of organisms. Food web. The relationships between the formations of organisms in the water. Various interactions between organisms in the water: competition for resources, predation, defence mechanisms, symbiosis, migration, invasive species. Processes linking reservoirs with their surrounding areas: transport of matter, estuary zones, ecotones. The functioning of aquatic ecosystems under the influence of anthropogenic pressure. The impact of pollution, hydrotechnical equipment and changes in the catchment on the biocenoses of stagnant and flowing water.

EDUCATIONAL OBJECTIVE:

Acquisition of knowledge about the mechanisms of aquatic ecosystems functioning in terms of their different types: lakes, ponds, reservoirs and water courses. Understanding the key factors shaping the biodiversity of species, the structure of the food web and the interactions between aquatic formations. Understanding the mechanisms of evolution and changes in the structure of aquatic ecosystems under the influence of natural and anthropogenic factors. Mastering the typical test methods used in hydrobiology and aquatic ecology.

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: P2A_K04++, P2A_U04+, P2A_U06+, P2A_U07++, P2A_W01++, P2A_W04+, P2A_W05+, P2A_W07+, R2A_K04+, R2A_K05++, R2A_U01+++, R2A_U05+, R2A_W03+++, R2A_W04+, R2A_W07+,

Codes of learning outcomes in a major area of study: K2A_K04+, K2A_K05+, K2A_K10++, K2A_U01++, K2A_U04++, K2A_U05+, K2A_U15+, K2A_W03+++, K2A_W04+, K2A_W06+, K2A_W07+, K2A_W11+,

LEARNING OUTCOMES:

Knowledge

- W1 - Comprehension and understanding the impact of processes occurring in surface waters with the participation of living organisms.
W2 - Knowledge of aquatic environments ecology, groups of organisms occurring in them and the interactions and relationships with the widely interpreted environment.
W3 - Knowledge of the diversity of aquatic ecosystems and the specifics of main types of surface waters.

Skills

- U1 - Ability to analyse the structure of aquatic ecosystems and assess the relationships between the different components of the environment.
U2 - Ability to recognize the degree of transformation and the natural state for different types of aquatic ecosystems, especially in shallow lakes and reservoirs, using conventional methods of assessment.
U3 - Ability to plan and carry out research using tools and techniques appropriate for the type of surface water.

Social competence

- K1 - Awareness of the sensitivity of aquatic ecosystems to anthropogenic influences and understanding of the need to counteract such change.
K2 - Understanding the need for water protection and its relationship with the protection of biodiversity and landscape, preparation to implement these principles and to educate people in the surrounding environment.

BASIC LITERATURE

- 1) Kajak Z., Hydrobiologia: limnologia. Ekosystemy wód śródlądowych, wyd. Wyd. Nauk. PWN Warszawa, 2001, s. 355; 2) Lampert W., Sommer U., Ekologia wód śródlądowych, wyd. Wyd. Nauk. PWN, Warszawa, 2001, s. 415; 3) Allan J.D., Ekologia wód płynących, wyd. Wyd. Nauk. PWN, Warszawa, 1998, s. 450; 4) Szoszkiewicz K., Zgoła T., Jusik Sz., Hryc-Jusik B., Dawson F.H., Raven P., Hydromorfologiczna ocena wód płynących, wyd. Wyd. Naukowe Biogucki, Poznań, 2010, s. 133

Course / module

Hydrobiology and Aquatic Ecology

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: mandatory

Course group: C - przedmioty specjalnościowe

ECTS code: 13056-26-C

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 2

Type of course:

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 15, Auditorium classes: 30

Teaching forms and methods

Lecture(K1, W1, W2, W3) : Lecture with multimedia presentation, Auditorium classes(null) : Auditorium exercises - practical exercises complementary to the practical part; Project classes - research project method; Field exercises - presentation of objects and practical application of research methods

Form and terms of the verification results:

LECTURE: Colloquium test - Text-descriptive colloquium of lecture material(K1, K2, U1, W1, W2, W3) ;AUDITORIUM CLASSES: Colloquium test - Collaborative test - in mixed form, covering test, descriptive and interpretive questions(K1, K2, U1, W1, W2, W3) ;AUDITORIUM CLASSES: Report - Final work out of the exercises in the form of compiling, describing and interpreting the results of the research project done on the exercises(U2, U3, W3)

Number of ECTS points: 2,5

Language of instruction: polski

Introductory courses:

Ecology, Limnology

Preliminary requirements:

Knowledge of the foundations of ecology and the functioning of lakes

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształowania Środowiska,

Person in charge of the course:

dr inż. Andrzej Skwierawski,

Course coordinators:

Notes:

SUPPLEMENTARY LITERATURE

- 1) Mikulski J.S., Biologia wód śródlądowych, wyd. wyd. PWN, Warszawa, 1982 , s. 481

Detailed description of the awarded ECTS points - part B

13056-26-C
ECTS:2,5
YEAR: 2019Z

HYDROBIOLOGY AND AQUATIC ECOLOGY

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: auditorium classes	30 h
- participation in: lecture	15 h
- consultation	2 h
	47 h

2. Student's independent work:

- preparation for classes	3 h
- preparation for test of classes material	6 h
- preparation for test of lecture material	6,5 h
- preparation of the final stages of the exercises	5 h
	20,5 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 67,5 h : 27 h/ECTS = 2,50 ECTS

average: **2,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	1,74 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,76 ECTS points,

**HYDROBIOLOGY AND BALTIC SEA PROTECTION****13056-29-C****ECTS: 1,5****YEAR: 2019Z****COURSE CONTENT****CLASSES:**

Develop reports and presentations based on statistical issues such as: exploitation of the Baltic Sea, the economic use of the Baltic Sea Waters, International cooperation in the Baltic region, pollution of marine waters, including pollution agricultural origin.

LECTURES:

The concept of hydrobiology and ecology. Flora of the Baltic Sea. Fauna of the Baltic Sea. Geography of the Baltic Sea, Economic exploitation of Baltic waters, International cooperation in the Baltic Sea Region, Pollution of marine waters, Pollution of agricultural origin.

EDUCATIONAL OBJECTIVE:

Students learn about the issues of the Baltic Sea with emphasis on its protection

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

Codes of learning outcomes in a major field of study: P2A_K04+, R2A_K05+, R2A_U01+, R2A_W03+,

Codes of learning outcomes in a major area of study: K2A_K10+, K2A_U15+, K2A_W16+,

LEARNING OUTCOMES:**Knowledge**

W1 - The student has knowledge in the field of natural and economic functions of the Baltic Sea, with particular reference to the risks arising from its exploitation.

Skills

U1 - The student is able to assess the problem of the devastation of the waters of the Baltic Sea, for example, in the context of international cooperation and pollution from agricultural sources.

Social competence

K1 - The student identifies problems of economic exploitation of the Baltic Sea basin and the environmental threats to the Baltic Sea flora and fauna.

BASIC LITERATURE

1) Sikora Alfons, Ochrona Bałtyku i jego zasobów, wyd. Ludowa Spółdzielnia Wydawnicza, 1988

SUPPLEMENTARY LITERATURE**Course / module**

Hydrobiology and Baltic Sea Protection

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: facultative**Course group:** C - przedmioty specjalnościowe**ECTS code:** 13056-29-C**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/ masters**Year/Semester:** 1 / 2**Type of course:**

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 10, Auditorium classes: 15**Teaching forms and methods**

Lecture(K1, U1, W1) : Lecture, Auditorium classes(K1, U1, W1) : Classes

Form and terms of the verification results:

LECTURE: Written test - Written test(W1)(K1, U1, W1) ;AUDITORIUM CLASSES: Presentation - Presentation(K1, U1)(K1, U1, W1) ;AUDITORIUM CLASSES: Write-up - Write-up - Report(K1, U1)(K1, U1, W1)

Number of ECTS points: 1,5**Language of instruction** polski**Introductory courses:**

Biology

Preliminary requirements:

Knowledge of environmental protection issues

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształtowania Środowiska,

Person in charge of the course:

dr Monika Panfil,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

13056-29-C
ECTS:1,5
YEAR: 2019Z

HYDROBIOLOGY AND BALTIC SEA PROTECTION

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	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparation for classes	15 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,



INTELLECTUAL PROPERTY PROTECTION

10056-29-O

ECTS: 0,25

YEAR: 2019Z

COURSE CONTENT

CLASSES:

no course classes

LECTURES:

Legal basis for protection of intellectual property. The concept of intellectual property. The content of intellectual property rights - copyright and related rights. Limitations on copyright. Permitted personal and public use of works. Copyright infringement (plagiarism and intellectual piracy).

EDUCATIONAL OBJECTIVE:

To familiarize students with the regulations in the field of intellectual property rights - principles, concepts, and selected procedures.

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: R2A_K01+, R2A_U04+, R2A_W08+,

Codes of learning outcomes in a major area of study: K2A_K01+, K2A_U04+, K2A_W08+,

LEARNING OUTCOMES:

Knowledge

W1 - Knowledge of a statutory conceptual apparatus related to legal protection of intellectual property.

Skills

U1 - The ability to identify and implement the permitted fields of exploitation of works.

Social competence

K1 - Conscious how to use of statutory fields of exploitation of works in the academic environment and private life

BASIC LITERATURE

1) Ewa Kucharska, Michele Le Mauviel, Aleksandra Auleytner, Jarosław Konecko, Rafał Kłoczko, Ustawa o prawie autorskim i prawach pokrewnych = Law on copyright and related rights. Prawo własności przemysłowej = Industrial property law, wyd. C.H.Beck, 2014

SUPPLEMENTARY LITERATURE

Course / module

Intellectual property protection

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: mandatory

Course group: O - przedmioty kształcenia ogólnego

ECTS code: 10056-29-O

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 2

Type of course:

Lecture

Number of hours per semester/week: Lecture: 2

Teaching forms and methods

Lecture(K1, U1, W1) : Lecture

Form and terms of the verification results:

LECTURE: Written test - Answering three questions(K1, U1, W1)

Number of ECTS points: 0,25

Language of instruction: polski

Introductory courses:

No introductory lectures

Preliminary requirements:

not required

Name of the organizational unit offering the course:

Katedra Agrotechnologii, Zarządzania Produkcją Rolniczą i Agrobiznesu,

Person in charge of the course:

prof. dr hab. inż. Krzysztof Jankowski,

Course coordinators:

Notes:

Detailed description of the awarded ECTS points - part B

10056-29-O

INTELLECTUAL PROPERTY PROTECTION

ECTS:0,25

YEAR: 2019Z

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: lecture	2 h
- consultation	0 h
	2 h

2. Student's independent work:

- getting acquainted with the digital version of the lecture	5,5 h
	5,5 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 7,5 h : 25 h/ECTS = 0,30 ECTS
average: **0,25 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,08 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,17 ECTS points,



01056-26-C

ECTS: 1,5

YEAR: 2019Z

INVASIVE SPECIES IN THE AQUATIC ENVIRONMENT**COURSE CONTENT****CLASSES:**

Characteristics of alien invasive species origin, methods of propagation, the spread and the rate of migration (settlement). Features of habitats susceptible to colonization by invasive species. The processes of plant invasions (start and dynamics) - Models of invasion. Comparison of biology and ecology of native species from invasive species. Develop and analyse the collected data. Characteristics, biology, threat of some invasive species - presentations. Proposals for the use of alternative crops for invasive species in fishing cultures: ponds, lakes and rivers. Prevention activities and methods and programs for the eradication of invasive species. Developing recommendations to reduce the impact of invasive plant and animal species deliberately introduced to water and currently available for purchase.

LECTURES:

Biodiversity and processes of plant invasions. Definitions: invasive species, alien, quarantine, introduced, re-introduced genetically modified GMO - opportunities and threats. Invasive organisms, nomenclature and classification. History of research on biological invasions and directions for further research into biological invasions. Objectives, introduction and reintroduction of species. Threats from alien species to wildlife. The harmfulness of alien invasive organisms for forestry, agriculture, fishing and hunting. Preventing an invasion of an alien species (border controls, quarantine, inspection, monitoring and alerting). The latest regulations on limiting the introduction of alien species in Poland, Europe and the world. Dealing with the threat of invasive alien species in the environment.

EDUCATIONAL OBJECTIVE:

Understanding the threats to native species and biodiversity caused by invasive organisms. Understanding the fundamental distinguishing features of organisms considered potentially invasive and the characteristics of aquatic habitats potentially exposed to colonization by invasive species and the ability to estimate and limit threats.

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: P2A_W05+, R2A_K03+, R2A_K04+, R2A_U01+, R2A_U06+, R2A_W04++

Codes of learning outcomes in a major area of study: K2A_K03+, K2A_K04+, K2A_U01+, K2A_U06+, K2A_W11+, K2A_W13++

LEARNING OUTCOMES:**Knowledge**

W1 - The student is able to assess the risks to biodiversity and identify the effects of the appearance of alien species introduced deliberately or accidentally into the aquatic environment.

W2 - The student can analyse data collected in the field on the occurrence of invasive species occurring in aquatic ecosystems and in their vicinity.

W3 - The student has knowledge of the need to reduce the occurrence of alien species intentionally introduced into ponds, lakes, rivers, forests, gardens, parks and replace them with native species.

Skills

U1 - The student is able to identify invasive alien species and observe their harmfulness.

U2 - The student is able to propose alternative species for alien invasive cultures used in fishing.

Social competence

K1 - The student is focused on the development of recommendations to reduce the impact of invasive plant and animal species deliberately or accidentally introduced into ecosystems.

K2 - The student is involved in collecting data on the incidence of invasive species in the field and consciously cares about the environment.

BASIC LITERATURE

1) Andrzejewski R., Weigle A, Różnorodność biologiczna Polski, wyd. Narodowa Fundacja Ochrony Środowiska, Warszawa, 2003, s. 284; 2) Andrew S. Pullin, Biologiczne podstawy ochrony przyrody, wyd. PWN Warszawa, 2005; 3) Barbara Tokarska-Guzik, Zygmunt Dajdok, Maria Zajac, Adam Zajac, Alina Urbisz, Władysław Danielewicz, Rośliny obcego pochodzenia w Polsce ze szczególnym uwzględnieniem gatunków inwazyjnych, wyd. Generalna Dyrekcja Ochrony Środowiska, 2012, s. 197

SUPPLEMENTARY LITERATURE

1) Elton C. S., Ekologia inwazji zwierząt i roślin, wyd. PWRiL Warszawa, 1967

Course / module

Invasive Species in the Aquatic Environment

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: facultative**Course group:** C - przedmioty specjalnościowe**ECTS code:** 01056-26-C**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/ masters**Year/Semester:** 1 / 2**Type of course:**

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 10, Auditorium classes: 15**Teaching forms and methods**

Lecture(K2, U2, W1) : Problem lecture, Auditorium classes(null) : The student performs appropriate tasks or exercises in the area and in the teaching room

Form and terms of the verification results:

LECTURE: Written test - Test - minimum 60% of good answers(K2, U2, W1); AUDITORIUM CLASSES: Presentation - Positive rating from the presentation(W2); AUDITORIUM CLASSES: Colloquium test - Student receives 5 tasks. Correct execution of 3 tasks allows to pass(K1, U1, W2, W3)

Number of ECTS points: 1,5**Language of instruction** polski**Introductory courses:**

Plant biology, dendrology, zoology

Preliminary requirements:

Knowledge of the basics of the identification of herbaceous species and trees

Name of the organizational unit offering the course:

Katedra Agroekosystemów,

Person in charge of the course:

dr hab. inż. Arkadiusz Stępień,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

01056-26-C
ECTS:1,5
YEAR: 2019Z

INVESIVE SPECIES IN THE AQUATIC ENVIRONMENT

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	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparation for tests	5 h
- preparing presentation, collecting fields material	10 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,



LAND USE PLANNING

02956-20-B

ECTS: 4

YEAR: 2019Z

COURSE CONTENT
CLASSES:

The range and content of study of conditions and directions of spatial management. The scope and content of Local Spatial Management Plan. Symbols used in the local zoning plan. The financial impact of the adoption of Local Spatial Management Plan (fee planning, betterment levies, for the exclusion of production). Planning decisions in the investment process. Graphic signs used in projects land development. Land development plan.

LECTURES:

The history of spatial planning. Basic concepts and definitions of the spatial economy. Systematic planning studies. Spatial planning at national and regional and local (contents, rules and procedure for the preparation, evaluation, consultation and approval). The effects of spatial, environmental and financial adoption of Local Spatial Management Plan. Repurposing and exclusion of agricultural and forestry production (procedure, fees, exemptions). Building and land development permits (types, content, rules for drawing up and issuing). Public participation in planning local development. Evaluation and valorisation of space planning.

EDUCATIONAL OBJECTIVE:

Students are familiar with: the basic concepts of spatial planning, the legal basis of spatial planning in Poland, systematic planning studies, principles, content, procedure of preparing, reviewing, consultation and adoption of planning studies, the spatial effects, environmental and financial effects of Local Spatial Management Plan, the procedure of agricultural land and forest production, principles of assessment and valorisation of the area. Awareness of the role of citizens in the process of local development planning.

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: P2A_K04+, P2A_U01+, R2A_K01+, R2A_K06+, R2A_U01+, R2A_W07++,

Codes of learning outcomes in a major area of study: K2A_K01+, K2A_K06+, K2A_U01+, K2A_W07+, K2A_W15+,

LEARNING OUTCOMES:

Knowledge

W1 - The student has extensive knowledge of the condition and the complex factors that determine the functioning and development of rural areas, identifies and evaluates the natural and cultural landscapes.

Skills

U1 - Student incorporates an ability to find, understand, analyse and creatively use the necessary information from various sources and in various forms appropriate for the protection of the environment.

Social competence

K1 - The student understands the need for learning throughout life, can inspire and organize the process of learning for other people, can interact and work in a group, take on different roles and have knowledge of measures to minimize the risks and predict the effects of activities in the field of environmental protection and management.

BASIC LITERATURE

1) Cymerman Ryszard, Podstawy planowania przestrzennego i projektowania urbanistycznego, wyd. Educaterra Olsztyn, 2011 ; 2) Cymerman Ryszard (red.), Planowanie przestrzenne dla rzeczoznawców majątkowych, zarządców oraz pośredników w obrocie nieruchomościami, wyd. Educaterra Olsztyn, 2011 ; 3) Cymerman Ryszard, Ekonomiczne i prawne aspekty odrolniania i odlesiania gruntów, wyd. Educaterra Olsztyn, 2009 ; 4) Senetra Adam, Cieślak Iwona, Kartograficzne aspekty oceny i waloryzacji przestrzeni, wyd. Educaterra Olsztyn, 2004

SUPPLEMENTARY LITERATURE

1) Niewiadomski Z. (red), Planowanie i zagospodarowanie przestrzenne komentarz, wyd. C.H.BECK Warszawa, 2011 ; 2) Parysek J.J. , Wprowadzenie do gospodarki przestrzennej: wybrane aspekty praktyczne, wyd. Wyd. Nauk. Uniwersytetu im. Adama Mickiewicza w Poznaniu, 2007 ; 3) Domański R. , Gospodarka przestrzenna: podstawy teoretyczne, wyd. Wyd. Nauk. PWN, 2007

Course / module

Land use planning

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: mandatory

Course group: B - przedmioty kierunkowe

ECTS code: 02956-20-B

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 2

Type of course:

Classes, Lecture

Number of hours per semester/week: Classes: 15, Lecture: 30

Teaching forms and methods

Classes(K1, U1, W1) : auditorium: analysis of planning documents with discussion, group work, case analysis, problem solving, Lecture(W1) : lecture with multimedia presentation

Form and terms of the verification results:

CLASSES: Colloquium test - passing the colloquium(U1) ;CLASSES: Write-up - passed on the assessment of the reports(K1, U1) ;LECTURE: Exam - Exam: written test with open questions and tasks(W1)

Number of ECTS points: 4

Language of instruction: polski

Introductory courses:

-

Preliminary requirements:

-

Name of the organizational unit offering the course:

Instytut Geografii i Gospodarki Nieruchomościami,

Person in charge of the course:

dr inż. Iwona Krzywnicka,

Course coordinators:

Notes:

brak

Detailed description of the awarded ECTS points - part B

02956-20-B
ECTS:4
YEAR: 2019Z

LAND USE PLANNING

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: classes	15 h
- participation in: lecture	30 h
- consultation	4 h
	49 h

2. Student's independent work:

- preparation for reports	20 h
- preparation for the exam	21 h
- preparation for the test	10 h
	51 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 100 h : 25 h/ECTS = 4,00 ECTS

average: **4 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	1,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	2,04 ECTS points,



01056-29-C

LAWS AND REGULATIONS IN WATER RESOURCE PROTECTION

ECTS: 1,5

YEAR: 2019Z

**COURSE CONTENT
CLASSES:**

The organization of environment management system in the European Union, EU directives relating to the environmental aspects of water management. The national rules relating to water management, general assumptions of the existing legal solutions relating to resources water. Legislation in the field of environmental regulations affecting the protection of waters. Integrated system for water quality management.

LECTURES:

Legal procedure in investments related to water management in relation to the Water Framework Directive. Guidelines for the preparation of the dossier in the investment process (request for a decision on the environmental conditions, application to establish location of a public investment, operat wodnoprawny). Preparing the application for a decision on the environmental conditions.

EDUCATIONAL OBJECTIVE:

To acquaint students with the Polish legislation and the European Union in the field of water conservation.

**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: InzA_W04+, P2A_K04+, P2A_K05+, P2A_K07+, P2A_U01+, P2A_U02+, P2A_U09+, P2A_W01+, P2A_W03+, P2A_W08+, R2A_K04+, R2A_K07+, R2A_U01+, R2A_U08+, R2A_U09+, R2A_W02+, R2A_W03+, R2A_W06+,

Codes of learning outcomes in a major area of study: K2A_K04+, K2A_K07+, K2A_U01+, K2A_U08+, K2A_U11+, K2A_W02+, K2A_W06+, K2A_W16+,

LEARNING OUTCOMES:**Knowledge**

W1 - the student has a thorough knowledge of the organization system of environmental management in Poland and the European Union

W2 - He knows the basic obligations of individual directives and laws on environmental aspects of water management

W3 - He knows the limitations of water management in areas of natural and legally protected nature

Skills

U1 - He has the ability to analyze the conformity of planned investments with the legislation of Poland and the European Union

U2 - He has the ability to use the design of investments affecting the quantitative and qualitative properties of waters from the national legislation and directives of the European Union

U3 - He has the ability to draw up the legal documentation needed to prepare the investment for implementation

Social competence

K1 - He is able to broaden his knowledge of new environmental problems and is able to look for positive solutions that compromise the requirements of water protection with the need for infrastructure development.

K2 - Understands the necessity, priorities of environmental requirements in the economic context of water protection activities

BASIC LITERATURE

1) Grabowska G., Europejskie prawo środowiska, wyd. Wydawnictwo prawnicze PWN, 2001, t. I, s. 230; 2) Iwanek-Chachaj E., Jerzmański J., Lebowa D, Prawo ochrony środowiska, wyd. LexisNexis, 2010, s. 464

SUPPLEMENTARY LITERATURE**Course / module**

Laws and Regulations in Water Resource Protection

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: facultative

Course group: C - przedmioty specjalnościowe

ECTS code: 01056-29-C

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 2

Type of course:

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 10, Auditorium classes: 15

Teaching forms and methods

Lecture(K1, K2, U1, U2, U3, W1, W2, W3) : lecture with multimedia presentation, Auditorium classes(K1, K2, U1, U2, U3, W1, W2, W3) : auditorium exercises

Form and terms of the verification results:

LECTURE: Colloquium test - multiple choice test with open questions(K1, K2, U1, U2, U3, W1, W2, W3) ;AUDITORIUM CLASSES: Control project - Preparation of semester work(K1, K2, U1, U2, U3, W1, W2, W3)

Number of ECTS points: 1,5

Language of instruction: polski

Introductory courses:

HYDROLOGY, WATER ENGINEERING, ENVIRONMENTAL ENGINEERING

Preliminary requirements:

Knowledge of basic legal acts related to environmental protection

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształtowania Środowiska,

Person in charge of the course:

dr inż. Marcin Sidoruk,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

01056-29-C

LAWS AND REGULATIONS IN WATER RESOURCE PROTECTION

ECTS:1,5

YEAR: 2019Z

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	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparation for classes	5 h
- preparation for the test	2 h
- prepare for the test of lectures	3 h
- preparing term paper	5 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,



Course / module syllabus - part A

MARINE ECOSYSTEMS

13056-29-C

ECTS: 1,5

YEAR: 2019Z

COURSE CONTENT

CLASSES:

The oceans of the world. A trip to the Maritime Aquarium in Gdynia. The project "We are building a marine aquarium" (in theory, in practice)

LECTURES:

The structure of ecosystems. World Ocean. Geography seabed. Atlantic Ocean. Pacific Ocean. Indian Ocean and the Arctic Ocean. Movement of sea water. Ocean currents. Coral reef.

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: P2A_W01+, R2A_K05+, R2A_U01+, R2A_W06+,

Codes of learning outcomes in a major area of study: K2A_K05+, K2A_U01+, K2A_W06+,

LEARNING OUTCOMES:

Knowledge

W1 - Students have the necessary knowledge of the structure of marine ecosystems, geography of the world's ocean and the principles of mass and energy changes in sea waters.

Skills

U1 - Students have the necessary skills and knowledge search ability in the analysis of marine biodiversity and geography resources.

Social competence

K1 - Students are aware of the responsibility for the state of the environment represented by the marine ecosystems, which are constantly subjected to anthropogenic pressure.

BASIC LITERATURE

1) Różańska Zofia, Ekologia środowiska morskiego, wyd. Wydawnictwo ART, 1999

SUPPLEMENTARY LITERATURE

Course / module

Marine Ecosystems

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: facultative

Course group: C - przedmioty specjalnościowe

ECTS code: 13056-29-C

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 2

Type of course:

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 10, Auditorium classes: 15

Teaching forms and methods

Lecture(K1, U1, W1) : Lecture, Auditorium classes(K1, U1, W1) : Classes

Form and terms of the verification results:

LECTURE: Colloquium test - Test of the lecture material(K1, U1, W1) ;AUDITORIUM CLASSES: Presentation - Presentation(K1, U1, W1) ;AUDITORIUM CLASSES: Write-up - Write-up - Report(K1, U1, W1)

Number of ECTS points: 1,5

Language of instruction: polski

Introductory courses:

Biology

Preliminary requirements:

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształowania Środowiska,

Person in charge of the course:

dr Monika Panfil,

Course coordinators:

Notes:

Detailed description of the awarded ECTS points - part B

13056-29-C
ECTS:1,5
YEAR: 2019Z

MARINE ECOSYSTEMS

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	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparing material for classes	15 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,



Course / module syllabus - part A

MASTER THESIS

01056-29-C

ECTS: 7

YEAR: 2019Z

COURSE CONTENT

CLASSES:

Write a master's thesis and preparation for the diploma exam.

LECTURES:

x

EDUCATIONAL OBJECTIVE:

Gaining deeper knowledge in a range of issues related to the master's thesis topic. Writing a master's thesis and preparation for the diploma exam.

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:

InzA_U02+, InzA_U04+, InzA_U05+, InzA_U06+, InzA_U07+, P2A_K01+, P2A_K04+, P2A_K05+, P2A_K06+, P2A_K07+, P2A_U01+, P2A_U02+, P2A_U04+, P2A_U07+, P2A_W05+, P2A_W06+, P2A_W07+, P2A_W09+, P2A_W10+, R2A_K01+, R2A_K04+, R2A_U01+, R2A_U04+, R2A_U06+, R2A_U08+, R2A_W04+, R2A_W05+, R2A_W08+,

Codes of learning outcomes in a major area of study:

K2A_K01+, K2A_K04+, K2A_K07+, K2A_K09+, K2A_U01+, K2A_U04+, K2A_U06+, K2A_U11+, K2A_W04+, K2A_W05+, K2A_W08+, K2A_W10+, K2A_W11+, K2A_W12+,

LEARNING OUTCOMES:

Knowledge

W1 - Know the basic principles from the scope of a copyright law and protection of intellectual property and work safety regulations.

W2 - Have knowledge concerning the most important problems in field of environmental protection and development. Fluent in environmental protection terminology.

W3 - Know and understand the methodology principles of research work.

Skills

U1 - Makes use of scientific literature from the scope of environmental development and protection.

U2 - Properly select research methods. Self-planning, conduct, analyze and assesses the correctness of the performed task in the scope of environmental protection.

Social competence

K1 - Understand the need for targeted education and self-improvement in the scope of environmental protection.

K2 - Correctly identify and solve dilemmas related to the environmental protection.

BASIC LITERATURE

1) The original specialized literature self-collected by the student and recommended by the tutor., -, wyd. -, -, t. -, s. -

SUPPLEMENTARY LITERATURE

Course / module

Master thesis

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: facultative

Course group: C - przedmioty specjalnościowe

ECTS code: 01056-29-C

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 2

Type of course:

MA Diploma Seminar

Number of hours per semester/week: MA Diploma Seminar: null

Teaching forms and methods

MA Diploma Seminar(K1, K2, U1, U2, W1, W2, W3) : MASTER'S WORKSHOP/ LABORATORY

Form and terms of the verification results:

MA DIPLOMA SEMINAR: Thesis - Thesis - Presentation of the master's thesis to a tutor. (K1, K2, U1, U2, W1, W2, W3)

Number of ECTS points: 7

Language of instruction: polski

Introductory courses:

lack

Preliminary requirements:

lack

Name of the organizational unit offering the course:

Katedra Mikrobiologii,

Person in charge of the course:

dr inż. Magdalena Zaborowska,

Course coordinators:

Notes:

Detailed description of the awarded ECTS points - part B

01056-29-C

MASTER THESIS

ECTS:7

YEAR: 2019Z

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: ma diploma seminar	h
- consultation	50 h
	50 h

2. Student's independent work:

0 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: **7 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	2,00 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	5,00 ECTS points,



MICROORGANISMS IN AQUATIC ECOSYSTEMS

01056-29-C

ECTS: 2,5

YEAR: 2019Z

COURSE CONTENT
CLASSES:

Sampling for microbiological analysis. Techniques for bacterial cultures on solid and liquid nutrient media. Determination of psychrophilic and mesophilic bacteria. Methods for determination of coliform bacteria. Isolation and culture of fungi on artificial media. Saprobic zones and indicator organisms occurring in them. Microscopic observation of water fungi from different zones saprobic. Risks resulting from the presence of pathogenic fungi. Microscopic observations and attempt classification of algae that cause eutrophication. The microbiological analysis of wastewater from the dairy industry and breweries. The microbiological analysis of activated sludge. The microbiological analysis of the water supply. The microbiological analysis of water and waste water treated with biologicals. Application of the test Microtox to assess the quality of water and wastewater. The microbiological analysis of benthos.

LECTURES:

Water as a living environment for microorganisms. Arrangement of microorganisms in water reservoirs. The role of microorganisms in aquatic ecosystems. Pollution of surface water. Bacteria pathogens occurring in the water and sewage. Illness causing viruses occurring in the water and sewage. Self-purification of water surfaces. Self-purification of water. Bacteriological health analysis of water. Bacteriological criteria for evaluation water quality. Microorganisms occurring in the sewage. Biological of methods for sewage treatment. Participation of biopreparations in the process of treatment water and sewage. Protection and sanitary condition of surface waters in the light of legal acts.

EDUCATIONAL OBJECTIVE:

Familiarization with the occurrence of and activity of microorganisms in aquatic environments, and sewage as well as familiarity with the biological aspects of reduction of organic pollutants. Development of skills in the use of bacteriological evaluation criteria hygienic and sanitary surface water for drinking

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: P2A_K04++, P2A_U04++, P2A_U06+, P2A_W01+, R2A_K05++, R2A_U04++, R2A_W01+, R2A_W05+,

Codes of learning outcomes in a major area of study: K2A_K10++, K2A_U04++, K2A_W01+, K2A_W05+,

LEARNING OUTCOMES:

Knowledge

W1 - The Student is defining and a participation of microorganisms in aquatic ecosystems is explaining.
W2 - Is able to characterize polluting surface waters and to present manners of the counteraction based on the activity of microorganisms.

Skills

U1 - On the basis of the knowledge gained performs microbiological analysis of water and sewage.
U2 - The Student has the skills in the choice of appropriate methods for the microbiological examination of water.

Social competence

K1 - The student understands the hazards arising from the presence of pathogenic microorganisms in the water.
K2 - The student is aware of the importance of microorganisms in the process of self-purification of water and sewage treatment.

BASIC LITERATURE

1) Rheinheimer G., "Mikrobiologia wód", wyd. PWRiL Warszawa, 1987, t. -, s. 272.; 2) Pawlaczyk-Szpilowa M., "Mikrobiologia wody i ścieków", wyd. PWN Warszawa, 1987, t. -, s. 219.; 3) Błaszczak M., "Mikroorganizmy w ochronie środowiska", wyd. PWN Warszawa, 2007, t. -, s. 196.; 4) Sen K., Ashbolt N.J., "Environmental Microbiology: Current Technology and Water Applications", wyd. Caister Academic Press, 2011, t. -, s. 316.

SUPPLEMENTARY LITERATURE

1) Kunicki-Goldfinger W., "Życie bakterii", wyd. PWN Warszawa, 2005, t. -, s. 616.; 2) Nickilin J., "Mikrobiologia (krótkie wykłady)", wyd. PWN Warszawa, 2000, t. -, s. 380.; 3) Duszkievicz-Reinhard W., Grzybowski R., Sobczak W., "Teoria i ćwiczenia z mikrobiologii ogólnej i technicznej", wyd. SGGW Warszawa, 2003, t. -, s. 317.

Course / module

Microorganisms in Aquatic Ecosystems

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: mandatory

Course group: C - przedmioty specjalnościowe

ECTS code: 01056-29-C

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 2

Type of course:

Laboratory classes, Lecture

Number of hours per semester/week: Laboratory classes: 30, Lecture: 15

Teaching forms and methods

Laboratory classes(K1, K2, U1, U2) : Laboratory exercises - work with the utilization of microscope, the preparation of microbiological preparations, lecture, Lecture(W1, W2) : Lecture with multimedia introduction, information lecture.

Form and terms of the verification results:

LABORATORY CLASSES: Colloquium test - 2 written tests after 5 questions. The assessment of sufficient - at least 60% correct answers to each question (W1, W2) ;LABORATORY CLASSES: All analytical results and observations must be correctly summarizes and correctly interpreted (K1, U2); LABORATORY CLASSES: Evaluation of the work and cooperation in the group - Evaluation of the work and cooperation in the group and subgroups. (K1, K2, U1).(K1, K2, U1, U2, W1, W2) ;LECTURE: Colloquium test - 5 questions. The assessment of sufficient - at least 60% correct answers to each question. (W1, W2).(K1, K2, U1, U2, W1, W2)

Number of ECTS points: 2,5

Language of instruction: polski

Introductory courses:

lack

Preliminary requirements:

lack

Name of the organizational unit offering the course:

Katedra Mikrobiologii,

Person in charge of the course:

dr inż. Edyta Boros-Lajszner,

Course coordinators:

Notes:

Zajęcia laboratoryjne mogą odbywać się maksymalnie w 16. osobowych grupach.

Detailed description of the awarded ECTS points - part B

01056-29-C
ECTS:2,5
YEAR: 2019Z

MICROORGANISMS IN AQUATIC ECOSYSTEMS

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: laboratory classes	30 h
- participation in: lecture	15 h
- consultation	2 h
	47 h

2. Student's independent work:

- preparation for classes	8 h
- preparation for test	6,5 h
- preparation of reports of the classes	6 h
	20,5 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 67,5 h : 27 h/ECTS = 2,50 ECTS

average: **2,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	1,74 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,76 ECTS points,

**MOBILE SYSTEMS FOR ENVIRONMENTAL MONITORING****01956-29-C****ECTS: 1,5****YEAR: 2019Z****COURSE CONTENT****CLASSES:**

Becoming acquainted with sample equipment used in environmental quality measurement systems, with particular focus on water quality. Types of data recorders working with the equipment. Examining the possibilities of controlling the equipment from the computer - uni- and bidirectional communication (analogue and digital connections). Calibration of the measuring equipment. Operation of mobile measuring systems using the example of a "MobiLab" mobile environmental monitoring laboratory.

LECTURES:

Importance of the use of mobile measurement systems in environmental monitoring. Definition and classification of measuring systems. Configuration and structures of measuring systems. Measuring system interfaces, computer buses. Remote transmission of measurement data. System calibration, gauging and adjustment. Trends in measurement technology development. Miniaturization of measurement systems.

EDUCATIONAL OBJECTIVE:

Learning the principles and methods used in environmental monitoring measurement systems.

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: P2A_K04+, P2A_U07+, R2A_K05+, R2A_U01+, R2A_W05+,

Codes of learning outcomes in a major area of study: K2A_K10+, K2A_U15+, K2A_W05+,

LEARNING OUTCOMES:**Knowledge**

W1 - The student knows the advantages, disadvantages, operating principles and use of advanced systems for measuring the quality of the environmental elements.

Skills

U1 - The student is able to use mobile measurement systems to evaluate the degree of environmental pollution.

Social competence

K1 - The student is able to identify the condition of the environment based on modern measurement methods.

BASIC LITERATURE

1) Warmiński Kazimierz, Bęś Agnieszka, Współczesna analiza instrumentalna w monitoringu jakości powietrza atmosferycznego. Automatyzacja systemów. Rozdział w: Analityka i monitoring środowiska. Teoria i praktyka, wyd. UWM w Olsztynie, 2011

SUPPLEMENTARY LITERATURE**Course / module**

Mobile Systems for Environmental Monitoring

Fields of education:

Obszar nauk rolniczych, leśnych i

weterynaryjnych, Obszar nauk przyrodniczych

Course status: facultative**Course group:** C - przedmioty specjalnościowe**ECTS code:** 01956-29-C**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/ masters**Year/Semester:** 1 / 2**Type of course:**

Classes, Lecture

Number of hours per semester/week: Classes: 15, Lecture: 10**Teaching forms and methods**

Classes(K1, U1, W1) : Laboratory classes - laboratory experiments preparing the equipment for field measurements. Field activities - using mobile equipment and mobile systems in field studies., Lecture(K1, W1) : Lecture with multimedia presentation.

Form and terms of the verification results:

CLASSES: Write-up - A report from the experiments and field studies conducted (arithmetic and subject-matter evaluation of the report content). One chance to retake in case of failure.(K1, U1, W1) ;LECTURE: Competention test - Minimum percentage of points necessary to obtain a credit is 50.(K1, W1)

Number of ECTS points: 1,5**Language of instruction:** polski**Introductory courses:**

-

Preliminary requirements:

Knowledge of elements of chemistry and physics.

Name of the organizational unit offering the course:

Katedra Chemii,

Person in charge of the course:

dr inż. Kazimierz Warmiński,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

01956-29-C

MOBILE SYSTEMS FOR ENVIRONMENTAL MONITORING

ECTS:1,5

YEAR: 2019Z

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: classes	15 h
- participation in: lecture	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparation for classes.	5 h
- preparation for the test from the material covered in lectures to obtain a credit.	5 h
- preparing report	5 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,



01156-29-C

ECTS: 1,5

YEAR: 2019Z

MOLECULAR DIAGNOSTICS OF PATHOGENIC MICROORGANISMS IN THE AQUATIC ENVIRONMENT**COURSE CONTENT****CLASSES:**

Methods of plant disease diagnosis (conventional methods, immunological techniques - ELISA, molecular biology techniques including PCR and real-time PCR assays, with particular emphasis on major fungal and bacterial pathogens). Diagnosis and identification of pathogens with the use of species-specific primers. Quantitative determination of microbial DNA and genes involved in toxin production.

LECTURES:

Methods (serological techniques, PCR) for the detection and identification of microorganisms in the aquatic environment. The concept of stress. Biotic and abiotic factors determining the development of pathogen populations in the aquatic environment. The effects of trace elements on plant cells in water bodies, microorganisms and aquatic habitats. The defence responses of cells in living organisms exposed to trace elements. Molecular defence mechanisms in living organisms in aquatic habitats exposed to fertilizers and pesticides.

EDUCATIONAL OBJECTIVE:

Students will be familiarized with modern diagnostic techniques (conventional methods, immunological techniques, molecular biology techniques including PCR and real-time PCR assays) used for the detection and identification of microorganisms in the aquatic environment. Students will learn how to perform diagnostic tests.

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

Codes of learning outcomes in a major field of study: P2A_K04+, P2A_U01+, P2A_W03+, P2A_W04+, R2A_K04+, R2A_U05+, R2A_W04+,

Codes of learning outcomes in a major area of study: K2A_K04+, K2A_U05+, K2A_W13+,

LEARNING OUTCOMES:**Knowledge**

W1 - Students will demonstrate an extensive knowledge of the functioning of living organisms (crop plants, fungi, bacteria, viruses, phytoplasmas and spiroplasmas) and their interactions at the molecular level and environmental threats. Students will be familiarized with molecular biology techniques and tools based on PCR data analysis, used for the detection and identification of pathogenic microorganisms.

Skills

U1 - Students will be able to analyse and evaluate research tasks involving DNA isolation and the application of PCR techniques, conventional and immunological methods for the detection and identification of various microorganisms.

Social competence

K1 - Students will be able to solve problems relating to the presence of undesirable microorganisms that are harmful to human and animal health.

BASIC LITERATURE

1) Klimiuk E., Łebkowska M., Biotechnologia w ochronie środowiska, wyd. PWN, Warszawa, 2008

SUPPLEMENTARY LITERATURE**Course / module**

Molecular Diagnostics of Pathogenic Microorganisms in the Aquatic Environment

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: facultative

Course group: C - przedmioty specjalnościowe

ECTS code: 01156-29-C

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 2

Type of course:

Laboratory classes, Lecture

Number of hours per semester/week: Laboratory classes: 15, Lecture: 10

Teaching forms and methods

Laboratory classes(K1, U1, W1) : Laboratory exercises - Traditional, molecular, immunological techniques used in the diagnosis of pathogenic microorganisms. Students themselves perform analyzes on the identification of microorganisms., Lecture(K1, U1, W1) : Lecture with multimedia presentation

Form and terms of the verification results:

LABORATORY CLASSES: Write-up - The student prepares a report on the practical part of DNA isolation and PCR analysis.(K1, U1, W1) ;LECTURE: Colloquium test - Written test consisting of 10 questions in a test form. Student receives a positive grade for giving a correct answer > 60% of the questions.(U1, W1)

Number of ECTS points: 1,5

Language of instruction polski

Introductory courses:

Microbiology, plant genetics, plant physiology and biochemistry, renaturalisation of water bodies

Preliminary requirements:

Knowledge of pathogenic microorganisms in the aquatic environment

Name of the organizational unit offering the course:

Katedra Entomologii, Fitopatologii i Diagnostyki Molekularnej,

Person in charge of the course:

dr hab. inż. Agnieszka Pszczółkowska, prof. UWM

Course coordinators:**Notes:**

grupy ćwiczeniowe 12-15 osób

Detailed description of the awarded ECTS points - part B

**01156-29-C MOLECULAR DIAGNOSTICS OF PATHOGENIC MICROORGANISMS IN
ECTS:1,5 THE AQUATIC ENVIRONMENT
YEAR: 2019Z**

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: laboratory classes	15 h
- participation in: lecture	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparation for classes. preparing a report on practical exercises and preparation for finalize the course.	15 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,



Course / module syllabus - part A

PATENT INFORMATION

16056-29-O

ECTS: 0,5

YEAR: 2019Z

COURSE CONTENT

CLASSES:

-

LECTURES:

Basic concepts and definitions relating to industrial property, patents, inventions, patent protection, industrial designs, utility models, trademarks, geographical indication, chip topography, protective laws, rights in registration. Copyright law and copyright protection. Related rights. Industrial property and the provisions of the Industrial Property Law. Industrial property protection system. Patents and inventions as objects of patent law. History of patents and patent policy. Subject matter of patents. Content and scope of a patent. Patent registration procedure. International access to patent information. Copyright law in the European Union. Copyright law in the Internet. Copyright transfer agreements. Systems for the protection of utility models and industrial designs.

EDUCATIONAL OBJECTIVE:

Students develop an understanding of the legal, normative and practical aspects of patenting and protecting inventions, industrial designs, utility models and know-how. They learn about the basic concepts, principles, goals and key regulations relating to Polish and European copyright laws.

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: R2A_K02+, R2A_U04+, R2A_W08++

Codes of learning outcomes in a major area of study: K2A_K02+, K2A_U04+, K2A_W08++

LEARNING OUTCOMES:

Knowledge

W1 - The student is familiar with industrial property concepts such as intellectual property, invention, patent, industrial design, utility model, geographical indication, chip topography and know-how.

W2 - The student is familiar with the patent policy and patent registration procedures in Poland and other countries.

Skills

U1 - The student identifies various types of industrial property, the applicable protection laws and protection periods.

Social competence

K1 - The student is aware of the importance of intellectual property protection. Student knows about the dangers and punishments resulting from the misappropriation of intellectual property by persons other than the creator or author.

BASIC LITERATURE

1) Załucki M., Licencja na używanie znaku towarowego., wyd. Warszawa, 2008 ; 2) Załucki M., Z problematyki użytkowania prawa do znaku towarowego., wyd. Warszawa, 2008 ; 3) Barta J., Markiewicz R., Prawo autorskie., wyd. Warszawa, 2008 ; 4) Jankowska M., Sokół A., Wicher A., Fundusze Europejskiej dla przedsiębiorców 2007-2013., wyd. Warszawa, 2010 ; 5) Kotarba W., Komentarz do prawa wynalazczego., wyd. PARK, Bielsko-Biała, 1995 ; 6) Golat R., Prawo autorskie i prawa pokrewne., wyd. Warszawa, 2006 ; 7) Akty prawne, Ustawa o „Prawie autorskim i prawach pokrewnych” z dn.04.02.1994. Tekst jednolity z późn.zm., wyd. Warszawa, 1994 ; 8) Barta J., Markiewicz R., Prawo autorskie., wyd. Warszawa, 2008 ; 9) Promińska A., Prawo własności przemysłowej., wyd. Warszawa, 2005

SUPPLEMENTARY LITERATURE

1) Akty prawne, Ustawa „Prawo własności przemysłowej” z dn. 30.06.2000 ,Tekst jednolity z późn zm., wyd. Warszawa, 2000

Course / module

Patent Information

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: mandatory

Course group: O - przedmioty kształcenia ogólnego

ECTS code: 16056-29-O

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 2

Type of course:

Lecture

Number of hours per semester/week: Lecture: 4

Teaching forms and methods

Lecture(K1, U1, W1, W2) : Lecture with multimedia presentation.

Form and terms of the verification results:

LECTURE: Competention test - After the lecture, a test will be carried out to check the level of knowledge.(K1, U1, W1, W2)

Number of ECTS points: 0,5

Language of instruction: polski

Introductory courses:

Preliminary requirements:

No prerequisites.

Name of the organizational unit offering the course:

Katedra Agrotechnologii, Zarządzania Produkcją Rolniczą i Agrobiznesu,

Person in charge of the course:

prof. dr hab. inż. Krzysztof Jankowski,

Course coordinators:

Notes:

Obecność obowiązkowa na wykładach.

Detailed description of the awarded ECTS points - part B

16056-29-O
ECTS:0,5
YEAR: 2019Z

PATENT INFORMATION

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: lecture	4 h
- consultation	0 h
	4 h

2. Student's independent work:

- analysis of literature given at the lecture.	5 h
- preparation for passing the competence test.	3,5 h
	8,5 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 12,5 h : 25 h/ECTS = 0,50 ECTS

average: **0,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,16 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,34 ECTS points,



13056-29-C

ECTS: 1,5

YEAR: 2019Z

**COURSE CONTENT
CLASSES:**

The meaning and scope of paleolimnological research. The methods and aims of the research of bottom sediments. Methods of sampling for analysis. Selection of equipment for the collection of deposits, depending on the research objectives. Determination of the physical characteristics and components of deposits by Troels-Smith. The evaluation of the transformations and changes in the trophic status of lakes on the basis of bottom sediments. Cores of sediments as a record of the history and evolution of lakes. Assessment of the pace of transformation of lakes based on cartographic data, morphometric traits and the shape and vegetation zones boundary.

LECTURES:

The evolution and succession of lake ecosystems. Aging and disappearance of lakes. The process of sedimentation and accumulation of sediments under different environmental conditions and types of reservoirs. Bottom sediments as a record of human activity on the environment in terms of local, regional and global levels. Lacustrine sediments dating - methods, research goals, scope and significance of the data obtained. Fundamentals of paleoecology. Finding the history of the lakes on the basis of the remains of aquatic organisms in the lake sediments. Lake as an environment enabling reading the history of changes in catchment land use and changes in climatic conditions. Examples of important paleolimnological research programmes for reservoirs in Poland and the worldwide.

EDUCATIONAL OBJECTIVE:

Understanding the mechanisms of evolution of lake ecosystems in the context of environmental changes in local and global scale. Become familiar with the paleolimnological stratigraphic methods.

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

Codes of learning outcomes in a major field of study: P2A_K04++, P2A_U04+, P2A_U06+, P2A_U07++, P2A_W01++, P2A_W04+, P2A_W05+, P2A_W07+, R2A_K04+, R2A_K05++, R2A_U01++, R2A_U05+, R2A_W03+++, R2A_W04+, R2A_W07+,

Codes of learning outcomes in a major area of study: K2A_K04+, K2A_K05+, K2A_K10++, K2A_U01++, K2A_U04++, K2A_U05+, K2A_U15+, K2A_W03+++, K2A_W04+, K2A_W06+, K2A_W07+, K2A_W11+,

LEARNING OUTCOMES:**Knowledge**

W1 - Knowledge about the evolutionary changes taking place within the lake ecosystems under the influence of natural processes and anthropogenic

W2 - Knowledge concerning with the mechanisms of formation of sediments in lakes

W3 - Basic knowledge about the scope, objectives and effects stratigraphic studies, qualitative and palynological lacustrine sediments

Skills

U1 - Ability to identifying the progress of transformation processes of lakes

U2 - Ability to interpreting the results of studies of sediments in a way that allows inferences about the past of the lake

U3 - Ability to search and retrieve information about changes to the environment on the basis of various cartographic materials

Social competence

K1 - Awareness of the existence of short-lived lake ecosystems and their vulnerability to negative external influences

K2 - Recognizing the effects of anthropogenic pressure exerted on ecosystems lakeside, feels the need to counteract the changes in their environment perception

BASIC LITERATURE

- 1) Cohen A.S., Paleolimnology. The history and evolution of lake systems, wyd. Oxford University Press, 2003, s. 500;
- 2) Wetzel R.G., Limnology. Lake and river ecosystems, wyd. Academic Press, Elsevier, 2001, s. 1008;
- 3) Tobolski K., Przewodnik do oznaczania torfów i osadów jeziornych, wyd. Wyd. Nauk. PWN, W-wa, 2000, s. 508;
- 4) Dybova-Jachowicz S., Sadowska A., Palinologia, wyd. Wydawn. Instytutu Botaniki PAN, 2003, s. 411

SUPPLEMENTARY LITERATURE

- 1) Faegri K., Iversen J., Podręcznik analizy pyłkowej, wyd. Wydawnictwa Geologiczne, Warszawa, 1978, s. 249;
- 2) Mojski J.E., Ziemia polskie w czwartorzędzie. Zarys morfogenezy, wyd. Wyd. PIG, W-wa, 2005, s. 404;
- 3) Alen P. A., Procesy kształtujące powierzchnię Ziemi, wyd. Wyd. Nauk. PWN, W-wa, 2000, s. 476

Course / module

Reconstruction of lakes

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: facultative**Course group:** C - przedmioty specjalnościowe**ECTS code:** 13056-29-C**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/masters**Year/Semester:** 1 / 2**Type of course:**

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 10, Auditorium classes: 15**Teaching forms and methods**

Lecture(K1, K2, W1, W2, W3) ; Auditorium classes(K1, U1, U2, U3, W2, W3) :

Form and terms of the verification results:

LECTURE: Colloquium test - null(K2, U1, U2, U3, W1, W2, W3) ;AUDITORIUM CLASSES: Report - null(K1, U1, U2, U3, W3) ;AUDITORIUM CLASSES: Colloquium test - null(K2, U1, U2, U3, W1, W2, W3)

Number of ECTS points: 1,5**Language of instruction:** polski**Introductory courses:**

Limnology

Preliminary requirements:

Basics of limnology

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształowania Środowiska,

Person in charge of the course:

dr inż. Andrzej Skwierawski,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

13056-29-C
ECTS:1,5
YEAR: 2019Z

RECONSTRUCTION OF LAKES

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	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparation for test of classes material	5 h
- preparation for test of lectures material	5 h
- preparing for the final stages of the exercises	5 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,



RECREATIONAL USE OF WATER

01956-29-C

ECTS: 1,5

YEAR: 2019Z

COURSE CONTENT
CLASSES:

Evaluation of the usefulness of natural and artificial reservoirs for recreation. Adjustment of natural and artificial water reservoirs to some forms of recreational use. Calculation of natural absorbency and capacity of the tourist area boundary. Amateur fishing. The role of the Polish Fishing Association in recreational use of water. Rules of the organization of sport fishing. Legal, fishing equipment, methods and techniques of fishing in standing waters and flowing. Special rules of fishery operations. Methods of analysis of recreational waters. Development of recreational selected coastal zone holding unused values of tourism and recreation.

LECTURES:

Tourist and recreational use of surface water in Poland and in the world. Concepts related to the recreational use of water. Capacity, tourist absorption. Tourist use of waterways in Poland. Legal conditions for recreational water use. Technical infrastructure in the recreational use of waters. The requirements of water quality for recreational activities including swimming. Recreational value of natural and artificial reservoirs. Ecological marinas in Poland. Water security. Methods of assessing the impact of tourism activity on the state of biodiversity.

EDUCATIONAL OBJECTIVE:

To acquaint students with the possibilities of using inland water reservoirs and flowing waters for recreation.

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

Codes of learning outcomes in a major field of study:

InzA_W02+, InzA_W03+, P2A_K01+, P2A_K04+, P2A_U04+, P2A_U06+, P2A_U07+, P2A_W01++, P2A_W04++, R2A_K01+, R2A_K04+, R2A_K06+, R2A_U01+++, R2A_U02+, R2A_U04+, R2A_W03+, R2A_W05+, R2A_W06+,

Codes of learning outcomes in a major area of study:

K2A_K01+, K2A_K04+, K2A_K06+, K2A_U01++, K2A_U02+, K2A_U04+, K2A_U15+, K2A_W01+, K2A_W03++, K2A_W06+, K2A_W14+, K2A_W16+,

LEARNING OUTCOMES:

Knowledge

W1 - Students have the knowledge to carry out a preliminary assessment of natural environment for recreational use.

W2 - Mastering the knowledge in the field of equipment and recreational facilities necessary for the operation of various forms of activity tourism and recreation.

W3 - Students also have knowledge of the basic concepts of recreational fishing and can describe the effects of recreational use on the development of the natural environment and species protection.

Skills

U1 - Students can identify opportunities to improve the environmental value of water bodies by proposing the proper form of recreational use of the basin.

U2 - Ability to use available sources of information in order to analyse the possible use of recreational waters.

U3 - The students can identify and evaluate factors and events affecting the ecological status of water bodies.

Social competence

K1 - The students are aware of the role of recreation in the protection of water bodies.

K2 - The students are able to assess the effects of human activities and are aware of the risks and understand the importance of principles used to protect and restore the aquatic environment.

BASIC LITERATURE

- 1) Deja W. , Przydatność rekreacyjna strefy brzegowej jezior Polski , wyd. wyd. Bogucki Wyd. Naukowe, 2001 ;
- 2) Kowalczyk A., Derek M., Zagospodarowanie turystyczne, wyd. Wyd. Nauk. PWN, Warszawa , 2010

SUPPLEMENTARY LITERATURE

- 1) Wołos A. , Rybactwo, wędkarstwo, ekorozwój. , wyd. Wyd. IRŚ Olsztyn., 2006

Course / module

Recreational use of water

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: facultative**Course group:** C - przedmioty specjalnościowe**ECTS code:** 01956-29-C**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/ masters**Year/Semester:** 1 / 2

Type of course:

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 10, Auditorium classes: 15

Teaching forms and methods

Lecture(K1, K2, U1, U2, U3, W1, W2, W3) :
Lecture with multimedia presentation,
Auditorium classes(K1, K2, U1, U2, W2) :
Auditory

Form and terms of the verification results:

LECTURE: Colloquium test - Written test(K1, K2, U1, U2, U3, W1, W2, W3) ;AUDITORIUM CLASSES: Colloquium test - Evaluation on the basis of partial assessments of correctly performed tasks(K1, K2, U1, U2, U3, W1, W2, W3)

Number of ECTS points: 1,5**Language of instruction** polski

Introductory courses:

Hydrology, Ekologia

Preliminary requirements:

Awareness of the dangers posed by irrational water management

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształowania Środowiska,

Person in charge of the course:

dr inż. Szymon Kobus,

Course coordinators:

Notes:

Detailed description of the awarded ECTS points - part B

01956-29-C
ECTS:1,5
YEAR: 2019Z

RECREATIONAL USE OF WATER

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	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparation for classes test	8 h
- preparation for lecture test	7 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,



13056-26-C

ECTS: 1,5

YEAR: 2019Z

RESOURCES AND PROTECTION OF GROUNDWATER**COURSE CONTENT
CLASSES:**

Rules for evaluating the size and quality of water resources. Principles and methods for determining the demand of abstraction of groundwater for existentially-economic purposes. The rules determine the performance of underground water. Determining the need for and methods of treatment recognized raw water intended for consumption. Methods of identifying deficit areas in the water. Risk assessment and identification of actions protective of groundwater. Active protection identification and removal of pollution sources of groundwater.

LECTURES:

History of hydrogeological studies in Poland. Water resources. Overview of regional mineralized water, thermal and recognized as medicinal. Hydrological processes and factors that modify them. Types of genetic and chemical groundwater. Regionalisation of hydrological groundwater in Poland. Characteristics of fresh groundwater. The impact of surface water for groundwater in terms of river basin. Sources of water pollution. Changes in groundwater quality. Threats and protection of fresh water against pollution.

EDUCATIONAL OBJECTIVE:

Familiarize students with: the hydrological basics of evaluation of resource exploitation of groundwater, with the current laws and procedures in place for assessing and documenting resources exploitation of groundwater, protection of water resources in the light of European Union regulations regarding dangers and sources of groundwater pollution in conjunction with the quality of surface water.

**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: P2A_K04+, P2A_U03+, R2A_K01+, R2A_K06+, R2A_U01+, R2A_U03+, R2A_W01+, R2A_W03+,

Codes of learning outcomes in a major area of study: K2A_K01+, K2A_K06+, K2A_U01+, K2A_U03+, K2A_W01+, K2A_W03+,

LEARNING OUTCOMES:**Knowledge**

W1 - The student knows the basic methods, techniques and tools needed in the performance of procedures related to the protection of water resources in the environment.

W2 - He has knowledge of the impact of natural and anthropogenic factors on the development of the quantity and quality of groundwater.

Skills

U1 - The student has the ability to find and use information from different sources, necessary for the preparation of records of groundwater resources and the ability to work with hydrological and hydrogeological maps in order to determine the rational management of water resources.

U2 - The student also the ability to determine the quality and methods of treatment of groundwater accounted for consumption.

Social competence

K1 - Understands the need to constantly extend and complement the knowledge about the environment, especially in terms of access to good quality water.

K2 - The student is aware of the risk of human intervention in the environment and the need for continuous monitoring of environmental factors, in order to protect groundwater resources.

BASIC LITERATURE

- 1) Chełmicki W., Woda zasoby, degradacja, ochrona., wyd. Wyd. PWN Warszawa, 2001 , s. 306; 2) Dąbrowski S., Górski J., Kapuściński J., Przybyłek J., Szczepański A. , Metodyka określania zasobów eksploatacyjnych ujęć zwykłych wód podziemnych, wyd. Wyd. Borgis Wydawnictwo Medyczne Warszawa, 2004 , s. 298; 3) Lenczewska-Samotyja E., Łowkis A., Zdrojewska N, Zarys geologii z elementami geologii inżynierskiej i hydrogeologii., wyd. Wyd. Oficyna Wydawnicza Politechniki Warszawskiej, 2000 , s. 143; 4) Macioszczyk A., Dobrzyński D. , Hydrogeochemia strefy aktywnej wymiany wód podziemnych., wyd. Wyd. PWN Warszawa, 2002 , s. 448; 5) Paczyński B. Sadurski A., ydrogeologia regionalna Polski, wyd. Wyd. PIG Warszawa, 2007, t. 1, s. 542

SUPPLEMENTARY LITERATURE

- 1) Paczyński B. Sadurski A., Hydrogeologia regionalna Polski , 2007, t. 2, s. 204

Course / module

Resources and protection of groundwater

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: facultative**Course group:** C - przedmioty specjalnościowe**ECTS code:** 13056-26-C**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/ masters**Year/Semester:** 1 / 2**Type of course:**

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 10, Auditorium classes: 15**Teaching forms and methods**

Lecture(K1, U2, W2) : Lecture with multimedia presentation, Auditorium classes(null) : Auditorium exercises

Form and terms of the verification results:

LECTURE: Written test - Written test material of instruction, five questions to problem.(K2, U1, U2, W1) ;AUDITORIUM CLASSES: Presentation - The preparation of the development and presentation in the form of a multimedia presentation of the scope of the assessment of resources and the protection of groundwater.(K1, U1, W2)

Number of ECTS points: 1,5**Language of instruction** polski**Introductory courses:**

Hydrology, meteorology, soil science

Preliminary requirements:

General knowledge in the field the water cycle in the environment, knowledge of basics of chemistry and circulation of water in the environment

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształowania Środowiska,

Person in charge of the course:

dr hab. inż. Sławomir Szymczyk, prof. UWM

Course coordinators:**Notes:**

liczebność grupy do 14 osób

Detailed description of the awarded ECTS points - part B

13056-26-C
ECTS:1,5
YEAR: 2019Z

RESOURCES AND PROTECTION OF GROUNDWATER

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	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparation of the study and a multimedia presentation	8 h
- preparing to pass a written knowledge lecture	7 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,



01956-20-D

ECTS: 3

YEAR: 2019Z

SPECIAL SEMINAR FOR BECHELOR DEGREE STUDENTS**COURSE CONTENT
CLASSES:**

Individual and group work of diploma students: presentation of the selected issues based on the literature. Review of the literature related to the aquatic ecosystem specific issues. Compilation of the information on environmental problems of water ecosystems required for the issues for final exam. Methodology of research within the scope of environmental protection and management. Methodology of master thesis structure (chapters, subchapters, references etc.). Selection of the problem being a subject of M.Sc. thesis. Presentation of the range of methods applied. Writing and graphical skills. Interpretation and verification of the study outcomes, confrontation with the literature. Formulation of conclusions and inferences.

LECTURES:

-

EDUCATIONAL OBJECTIVE:

Preparation of the student to prepare a master's degree thesis and to pass the final examination. The aim of the education is preparation of a diploma student to the research and creative approach of solving water-related problems, including perception and verbalization of water pollution, ecosystem services and management, formulating scientific hypotheses, ability to logical and efficient selection of materials and methods, literature, applying statistics, logical presentation of research outcomes and effective discussion.

**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: P2A_K01+, P2A_K04+, P2A_K05+, P2A_K07+, P2A_U01+, P2A_U09+, P2A_U10+, P2A_W01+, P2A_W03+, P2A_W04+, R2A_K01+, R2A_K05+, R2A_K07+, R2A_U01+, R2A_U08+, R2A_U09+, R2A_W04+, R2A_W06+,

Codes of learning outcomes in a major area of study: K2A_K01+, K2A_K07+, K2A_K10+, K2A_U01+, K2A_U08+, K2A_U09+, K2A_W06+, K2A_W13+,

LEARNING OUTCOMES:**Knowledge**

W1 - The student has knowledge of scientific methodologies. She/he possesses knowledge concerning the most important problems in the field of water resource protection and development. Knows and understands the methodology principles of research work. She/he is familiar with statistical analyses of the results and properly formulates conclusions. The student knows the methodology and rules of master thesis preparation, the basic principles of copyright law and protection of intellectual property and work safety regulations.

Skills

U1 - The student is able to apply the methodological principles in his/her research work. She/he is familiar with statistical analyses to properly analyse the results and infer conclusions.
U2 - The student skilfully complies and interprets the results of the research outcomes and compares them with the literature.

Social competence

K1 - The student is prepared for research work and understands the need for constant life-long learning.
K2 - She/he has got the ability to plan, inspire, work in groups. She/he is able to use the achieved knowledge in teamwork following legal and ethical principles.

BASIC LITERATURE

1) Glatthom, A.A., Writing the winning thesis or dissertation: A step-by-step guide. , wyd. Thousand Oaks,, 2005 ; 2) Brown, R. , Doing your dissertation in business and management: The reality of researching and writing. , wyd. SAGE, 2006

SUPPLEMENTARY LITERATURE

1) Varia, Relevant literature/ articles published in enviornmental engineering , wyd. varia, 200x

Course / module

Special seminar for bechelor degree students

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: facultative**Course group:** D - przedmioty specjalizacyjne**ECTS code:** 01956-20-D**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/ masters**Year/Semester:** 1 / 2**Type of course:**

Diploma seminar

Number of hours per semester/week: Diploma seminar: 45**Teaching forms and methods**

Diploma seminar(null) : Presentation, multimedia presentation, analysis of papers and presentations, discussion.

Form and terms of the verification results:

DIPLOMA SEMINAR: Evaluation of the work and cooperation in the group - Evaluation of presentations, speeches and activities in discussion.(K1, K2, U1, U2, W1) ;DIPLOMA SEMINAR: Presentation - Presentation (literature analysis, multimedia, oral) - Substantive evaluation of content and presentation.(U1, U2, W1)

Number of ECTS points: 3**Language of instruction:** polski**Introductory courses:**

-

Preliminary requirements:

-

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształowania Środowiska,

Person in charge of the course:

prof. dr hab. inż. Katarzyna Glińska-Lewczuk,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

01956-20-D

SPECIAL SEMINAR FOR BECHELOR DEGREE STUDENTS

ECTS:3

YEAR: 2019Z

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: diploma seminar	45 h
- consultation	0 h
	45 h

2. Student's independent work:

- collection and analysis of literature	15 h
- preparing speeches and presentations	15 h
	30 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 75 h : 25 h/ECTS = 3,00 ECTS
average: **3 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	1,80 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	1,20 ECTS points,



13956-26-C

ECTS: 1,5

YEAR: 2019Z

THE MOST VALUABLE AQUATIC ECOSYSTEMS IN THE WORLD

COURSE CONTENT

CLASSES:

Typology of freshwater and marine ecosystems. Examples of the most valuable water ecosystem characteristics, including conservation and successful management strategies, will be presented. Ecosystem services analysis.

LECTURES:

An overview of the structure and functioning of freshwater and marine aquatic ecosystems. Overview of a number of challenges facing the most threatened and valuable aquatic ecosystems. Analyses of approaches and strategies that can be used to solve these challenges. Examples and scenarios will be presented based both on regional and global perspective to aquatic conservation issues and how regional differences in problems and solutions exist. Emphasis will be placed on the importance of using science to generate successful management strategies.

EDUCATIONAL OBJECTIVE:

Students will acquire knowledge on the primary forces responsible for the health and functioning of aquatic ecosystems and will also comprehend the importance of water in providing essential ecosystem services. Students will have the opportunity to apply this basic knowledge in 'real-life' conservation scenarios of the most precious water ecosystems, recognizing the role of humans in both the degradation and preservation of aquatic ecosystems, and how human actions can impact ecosystem services. Students will also improve their ability to think critically, learn independently, function in a team or group learning setting and obtain working knowledge of biological and ecological concepts required for aquatic ecosystem conservation.

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: P2A_K03+, P2A_W01+, R2A_U01+,

Codes of learning outcomes in a major area of study: K2A_K03+, K2A_U01+, K2A_W01+,

LEARNING OUTCOMES:

Knowledge

W1 - The student understands complex environmental phenomena and processes.

Skills

U1 - The student shows an ability to search, understand, analyse and use the required data from different sources and in various forms adequate to the study course.

Social competence

K1 - The student acquires knowledge of activities focused on risk attenuation and predicting the effects for agriculture and environment.

BASIC LITERATURE

1) Kajak Z., "Hydrobiologia – Limnologia. Ekosystemy wód śródlądowych.", wyd. wyd. PWN, 1998 ; 2) Allan J.D., "Ekologia wód płynących.", wyd. wyd. PWN, 1998 ; 3) Lampert W., Sommer U., "Ekologia wód śródlądowych.", wyd. wyd. PWN, 1996 ; 4) Andrew S. Pullin (red. J. Weinaera), "Biologiczne podstawy ochrony przyrody", wyd. wyd. PWN, 2004

SUPPLEMENTARY LITERATURE

1) Karrie Lynn Pennington and Thomas V. Cech, , Introduction to water resources and environmental issues, wyd. Cambridge University Press, 2010 , s. 468

Course / module

The Most Valuable Aquatic Ecosystems in the World

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: facultative

Course group: C - przedmioty specjalnościowe

ECTS code: 13956-26-C

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 2

Type of course:

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 10, Auditorium classes: 15

Teaching forms and methods

Lecture(K1, U1, W1) : Lecture -presentation in PP, Auditorium classes(null) : Discussion, raport presentation

Form and terms of the verification results:

LECTURE: Part in the discussion - Taking part in the discussion (K1, U1, W1) ;LECTURE: Evaluation of the work and cooperation in the group - Evaluation of the work and cooperation in the group - class attendance (K1, U1, W1) ;AUDITORIUM CLASSES: Report - Raport- characteristics of the chosen water ecosystems including its threats and conservation methods, management strategies (U1, W1) ;AUDITORIUM CLASSES: Evaluation of the work and cooperation in the group - Evaluation of the work and cooperation in the group - class attendance, independent readings of both primary literature and the textbook, group discussions, group research activities (K1, U1, W1)

Number of ECTS points: 1,5

Language of instruction: polski

Introductory courses:

Hydrology, Ecological engineering, Environmental Engineering

Preliminary requirements:

none

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształowania Środowiska,

Person in charge of the course:

prof. dr hab. inż. Katarzyna Glińska-Lewczuk,

Course coordinators:

Notes:

Detailed description of the awarded ECTS points - part B

13956-26-C
ECTS:1,5
YEAR: 2019Z

THE MOST VALUABLE AQUATIC ECOSYSTEMS IN THE WORLD

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	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparation for classes, as per the syllabus	7 h
- prepare the report as required by the lecturer, within a specified time.	8 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,

**01056-29-C****ECTS: 1,5****YEAR: 2019Z****THREATS AND CONSERVATION OF SPECIES DIVERSITY****COURSE CONTENT****CLASSES:**

Characteristics of the most important communities of aquatic vegetation and vegetation in coastal zone - species characteristics, occurrence, economic importance and nature. Rare and protected species of plants of aquatic vegetation.

LECTURES:

Basic levels of biodiversity. Biodiversity indicators. Macrophytes in freshwater communities in meso- and eutrophic reservoirs of inland waters, plant communities meso- and oligotrophic lakes, pleustonic communities. The vegetation in a coastal zone - rush communities, sedge communities, peatland vegetation. Protected species of aquatic communities and vegetation in coastal zone. Factors contributing to maintain biodiversity.

EDUCATIONAL OBJECTIVE:

Understanding the risks and protect species diversity of communities of aquatic vegetation and vegetation in a coastal zone

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

Codes of learning outcomes in a major field of study: R2A_K05+, R2A_U05+, R2A_W04+,

Codes of learning outcomes in a major area of study: K2A_K10+, K2A_U05+, K2A_W13+,

LEARNING OUTCOMES:**Knowledge**

W1 - Students have knowledge of the risks and protection of species diversity of communities of aquatic vegetation and vegetation in a coastal zone

Skills

U1 - Students can identify the factors affecting the state of biodiversity of communities of aquatic vegetation and vegetation in a coastal zone.

Social competence

K1 - Awareness of the need to protect species diversity of communities of aquatic vegetation and vegetation in a coastal zone

BASIC LITERATURE

1) Wysocki C., Sikorski P., Fitosocjologia stosowana, wyd. SGGW, 2009, s. ss.498

SUPPLEMENTARY LITERATURE

1) Matuszkiewicz W., Przewodnik do oznaczania zbiorowisk roslinnych Polski, wyd. PWN, 2008, s. ss.536

Course / module

Threats and conservation of species diversity

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: facultative

Course group: C - przedmioty specjalnościowe

ECTS code: 01056-29-C

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 2

Type of course:

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 10, Auditorium classes: 15

Teaching forms and methods

Lecture(K1, W1) : Lecture with multimedia presentation, Auditorium classes(K1, U1) : Presentations made by students and discussion

Form and terms of the verification results:

LECTURE: Written test - Multiple choice test(W1) ;AUDITORIUM CLASSES: Presentation - Positive evaluation of the presentation(K1, U1)

Number of ECTS points: 1,5

Language of instruction: polski

Introductory courses:**Preliminary requirements:****Name of the organizational unit offering the course:**

Katedra Łąkarstwa i Urządzania Terenów Zieleni,

Person in charge of the course:

prof. dr hab. Stefan Grzegorzczuk,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

01056-29-C

THREATS AND CONSERVATION OF SPECIES DIVERSITY

ECTS:1,5

YEAR: 2019Z

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: auditorium classes	15 h
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- participation in: lecture	10 h
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- consultation	2 h
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27 h

2. Student's independent work:

- preparing a presentation	15 h
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15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher: 0,96 ECTS points,

- including the number of ECTS points for hours completed in the form of the student's independent work: 0,54 ECTS points,



01056-29-C

ECTS: 1,5

YEAR: 2019Z

USING HORTICULTURAL PLANTS FOR PHYTOREMEDIATION

COURSE CONTENT

CLASSES:

Hyper-accumulators in phytoremediation. Horticultural plants used for phytoextraction, phytodegradation, phytostabilisation, rhizofiltration and phytovolatilisation. Horticultural plants for phytoremediation sites in urban and industrial areas contaminated with emergency spills of crude oil. The economic importance of phytoremediation.

LECTURES:

Techniques of phytoremediation. Continuous and supported phytoextraction. Substances supporting the process of phytoextraction. Phytodegradation. Phytostabilization. Rhizofiltration.

EDUCATIONAL OBJECTIVE:

Learning about new solutions for the removal or detoxification of the soil and air pollution with heavy metals and xenobiotics by horticultural plants.

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: R2A_K06+, R2A_U06+, R2A_W05+,

Codes of learning outcomes in a major area of study: K2A_K06+, K2A_U06+, K2A_W05+,

LEARNING OUTCOMES:

Knowledge

W1 - The student demonstrates knowledge of basic methods, techniques, technologies, tools, materials and their practical applications to remove contaminants from the environment using plants.

Skills

U1 - Has the ability to solve practical tasks related to the potential use of horticultural plants in phytoremediation to improve the environment.

Social competence

K1 - The student knows the importance of phytoremediation in environmental protection.

BASIC LITERATURE

1) GAWROŃSKI, Fitoremediacja - rośliny jako narzędzia w oczyszczeniu powietrza w terenach zurbanizowanych, wyd. SGGW, 2011

SUPPLEMENTARY LITERATURE

Course / module

Using Horticultural Plants for Phytoremediation

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: facultative

Course group: C - przedmioty specjalnościowe

ECTS code: 01056-29-C

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 2

Type of course:

Laboratory classes, Lecture

Number of hours per semester/week: Laboratory classes: 15, Lecture: 10

Teaching forms and methods

Laboratory classes(K1, U1, W1) : Theoretical knowledge represented using a multimedia presentation. Laboratory - perform experiments related to the use of horticultural plants in phytoremediation , Lecture(K1, U1, W1) : Lecture using multimedia presentations

Form and terms of the verification results:

LABORATORY CLASSES: Colloquium test - Written test - 60% of messages shown in exercise time (K1, U1, W1) ;LABORATORY CLASSES: Presentation - Presentation - preparation of paper in the form of presentation on the subject item (K1, U1, W1) ;LECTURE: Colloquium test - Written test - 60% of the messages presented during lectures (K1, U1, W1)

Number of ECTS points: 1,5

Language of instruction: polski

Introductory courses:

-

Preliminary requirements:

-

Name of the organizational unit offering the course:

Katedra Ogrodnictwa,

Person in charge of the course:

dr hab. inż. Joanna Majkowska-Gadomska,

Course coordinators:

Notes:

przedmiot prowadzony w małych grupach - 12 osobowych

Detailed description of the awarded ECTS points - part B

01056-29-C

USING HORTICULTURAL PLANTS FOR PHYTOREMEDIATION

ECTS:1,5

YEAR: 2019Z

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: laboratory classes	15 h
- participation in: lecture	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparation for test	8 h
- preparing paper in the form of presentation	7 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,



Course / module syllabus - part A

WATER ECOSYSTEMS

13056-29-C

ECTS: 1,5

YEAR: 2019Z

COURSE CONTENT
CLASSES:

Classification of water ecosystems. Hydrographic map and other sources of hydrological data. Hydrographic catchment parameters. Hydrography and hierarchy of a river network. Characteristics of a chosen river system. Base of location of man-made water bodies objects. Hydro-morphological assessment of a stream channel section (outdoor classes), including an assessment of the degree of naturalness of the stream channel. Hydrological measurements of surface and groundwater. Morphological characteristics of bank zone of a reservoir or a river.

LECTURES:

The course of "Water ecosystems" covers all facets of fresh water aquatic habitats, and therefore, considers the physical, chemical and biological characteristics of freshwater ecosystems. Significance of water ecosystems in the landscape. Geomorphologic features formed by water. Fluvial landscapes. The role of groundwater in the landscape. Functions of lakes in the landscape. Types and role of the retention reservoirs. Artificial water bodies in the urban areas. Waterfronts and ports. Boulevards. Methods of water ecosystems management for recreation and economical purposes. Water ecosystem threats and restoration – the most interesting investments worldwide.

EDUCATIONAL OBJECTIVE:

The course of "Water ecosystems" deals with the importance of water ecosystems for human life. Student should define and characterize the factors influencing fluvial landscapes based on the hydrological and geomorphological knowledge. Student should characterize functions of water ecosystems in the natural and cultural landscapes. Student should possess ability to assess water-related changes in the environment. Student should understand the vitality of water features for nature protection, recreation and aesthetics. Student should explain causes of aquatic ecosystems degradation and indicate methods of the water ecosystem restoration.

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: P2A_K03+, P2A_U01+, P2A_W01+,

Codes of learning outcomes in a major area of study: K2A_K03+, K2A_U01+, K2A_W01+,

LEARNING OUTCOMES:

Knowledge

W1 - Student is conscious of the importance of water ecosystems and indicate water as a factor forming landscapes. Student should understand the vitality of water bodies for nature protection, recreation and aesthetics. Student should explain causes of aquatic ecosystems degradation and indicate methods of the water ecosystem restoration

Skills

U1 - student should be able to find relevant sources of hydrological information, and know how to interpret the hydrological data-set. She/he should assess the degree of naturalness of a stream channel. Should be creative in solving restoration problems, he/she should design and present her/his ideas. She/he should be able to follow new developments and literature in the using water features

Social competence

K1 - Student should use the achieved knowledge in conservation problems of water ecosystems. Student should understand to stay up-to-date with contemporary trends in the use of water. Student should take an initiative in creations of projects, as well as be able to objectively assess her/his own ideas and be active in discussions

BASIC LITERATURE

1) brak, brak, wyd. brak, brak

SUPPLEMENTARY LITERATURE

Course / module

Water ecosystems

Fields of education:

Obszar nauk przyrodniczych

Course status: facultative**Course group:** C - przedmioty specjalnościowe**ECTS code:** 13056-29-C**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/ masters**Year/Semester:** 1 / 2

Type of course:

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 10, Auditorium classes: 15

Teaching forms and methods

Lecture(K1, U1, W1) : Lectures with multimedia presentation. Discussion, Auditorium classes(K1, U1, W1) : The class includes a mix of lectures, discussion, guest speakers and site visits. Students are expected to do all of the assigned readings, participate in class discussions and activities in an active and informed manner, complete all of the assignments, and attend all required site visits.

Form and terms of the verification results:

LECTURE: Written exam - Final exam (written form, min. 60% of proper answers gives full credit). The exams will focus on material that has been presented during lectures, and material that is the focus of review questions.(U1, W1) ;AUDITORIUM CLASSES: Colloquium test - Midterm exam and final exam (U1, W1) ;AUDITORIUM CLASSES: Part in the discussion - Lecture participation Active participation in the course (discussion) 5%(K1, U1, W1) ;AUDITORIUM CLASSES: Report - Report on water ecosystem characteristics, threats and a relevant method of its restoration (45%)(U1, W1)

Number of ECTS points: 1,5**Language of instruction** polski

Introductory courses:

hydrology, limnology, ecology

Preliminary requirements:

brak

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształowania Środowiska,

Person in charge of the course:

prof. dr hab. inż. Katarzyna Glińska-Lewczuk,

Course coordinators:

Notes:

Projekt będzie realizowany w języku angielskim

Detailed description of the awarded ECTS points - part B

13056-29-C
ECTS:1,5
YEAR: 2019Z

WATER ECOSYSTEMS

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	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- final project on a topic of student's choice	10 h
- self-learning before auditory classes	5 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,



01056-29-C

ECTS: 1,5

YEAR: 2019Z

WATER RESOURCE MANAGEMENT IN PROTECTED AREAS

COURSE CONTENT
CLASSES:

Evaluation of the impact of human activities on selected protected areas. Legal procedures in the investment process in protected areas. Principles for implementing applications for administrative decisions. Execution of sampling water permit investments related to water management in the protected area.

LECTURES:

The basic obligations of operators engaged in investments in protected areas resulting from various directives and laws relating to the environmental aspects of water management. Possibilities of economic use of water in protected areas. Projects related to water management with a significant impact on natural areas. The impact of the various projects on the natural ecosystems (dams and barrages, small retention, flood dikes and polders, etc.). Investments related to ecosystem restoration of wetlands.

EDUCATIONAL OBJECTIVE:

To acquaint students with the possibilities of water management in protected areas, the use of solutions to prevent and counteract the adverse transformations ecologically valuable areas, the use of technical and biological solutions aimed at rational water management and protection of natural values.

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

Codes of learning outcomes in a major field of study:	InzA_U08+, P2A_K04++, P2A_U01+, P2A_U02+, P2A_W01+, P2A_W03+, P2A_W07+, R2A_K04+, R2A_K05+, R2A_U05+, R2A_U08+, R2A_U09+, R2A_W03+, R2A_W04+, R2A_W06+,
Codes of learning outcomes in a major area of study:	K2A_K04+, K2A_K10+, K2A_U05+, K2A_U11+, K2A_W04+, K2A_W06+, K2A_W16+,

LEARNING OUTCOMES:

Knowledge

- W1 - The student has a thorough knowledge of the functioning of ecosystems and human impact on the natural environment.
W2 - He knows the basic obligations under the various directives and laws relating to the environmental aspects of water management.
W3 - He knows the limitations related to water management in highly natural and legally protected areas.

Skills

- U1 - He/she has the ability to take into account in the design of water management areas the ecologically valuable possibility of the occurrence environmental threats, degradation of water and vegetation and the introduction of methods of natural and technical restoration of water bodies.
U2 - He/she has the ability to follow the national regulations relating to water management in protected areas.

Social competence

- K1 - He/she understands the need for development of water management in the region, taking into account human needs on a par with the protection requirements.
K2 - Understands the need, priorities of environmental requirements before the economic activities related to water management in areas with high natural values.

BASIC LITERATURE

- 1) Kędziora A., Przyrodnicze podstawy gospodarowania woda w Polsce. W: Ochrona środowiska w gospodarce przestrzennej, wyd. PAN Poznań, 2005, s. 75-113; 2) Żelazo J., Popek Z., Podstawy renaturyzacji rzek, wyd. SGGW, 2003, s. 319

SUPPLEMENTARY LITERATURE

Course / module

Water Resource Management in Protected Areas

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: facultative

Course group: C - przedmioty specjalnościowe

ECTS code: 01056-29-C

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 1 / 2

Type of course:

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 10, Auditorium classes: 15

Teaching forms and methods

Lecture(K2, U1, U2, W1, W3) ; Auditorium classes(K1, U1, W1, W2) : Lecture with multimedia presentation

Form and terms of the verification results:

LECTURE: Project - execution term paper, project preparation(K1, U1, U2, W1, W2) ;AUDITORIUM CLASSES: Colloquium test - multiple choice questions (tasks) open(K1, K2, U1, U2, W1, W2, W3)

Number of ECTS points: 1,5

Language of instruction: polski

Introductory courses:

hydrology, water engineering, environmental engineering

Preliminary requirements:

knowledge of basic laws on environmental protection

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształtowania Środowiska,

Person in charge of the course:

dr inż. Marcin Sidoruk,

Course coordinators:

Notes:

Detailed description of the awarded ECTS points - part B

01056-29-C

WATER RESOURCE MANAGEMENT IN PROTECTED AREAS

ECTS:1,5

YEAR: 2019Z

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	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparation for classes	7 h
- preparation for passes the material the lecture	2 h
- preparation for the test	2 h
- preparing term paper	4 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,



01956-29-C

ECTS: 1,5

YEAR: 2019Z

WATER RESOURCE MANAGEMENT IN RIVER BASINS**COURSE CONTENT****CLASSES:**

Planning of water resource management in river basins, study procedures, water and economic policies and processes for the authorization for the execution of small hydropower projects, development of water management and protection of hydrological extreme events. Recognition of river water for urban, industrial, agricultural purposes, construction and modernization of water systems for the collection of water to meet the water demands of the population and the economy.

LECTURES:

Water balance and its components. Water circulation means and the possibility of its regulation. The phenomenon of outflow origin drain and its effects. Possibilities and methods of water management in river basins. The local dimension of water management. The activities in the catchment area to increase the resources of soil water in the unsaturated zone and saturation. Small retention. The effects of circulating water in the environment. Measures to regulate water relations. The needs of technical infrastructure in terms of water management in small catchments, its functions, the effect of lack of infrastructure. The criteria for the distribution of drainage. Features of drainage. A review of the methods of regulating the relationship of air-water and carbon soil waterlogged by both technical as well as phytotechnical and agronomic measures.

EDUCATIONAL OBJECTIVE:

The aim of the course is to acquaint students with the possibilities and methods of development and protection of water resources in river basins by understanding forms of retention and water management projects using non-technical and technical means contributing to the increase of the quantity and improve of water quality by slowing the circulation and the associated circulation of chemical ingredients.

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: InzA_U05+, InzA_W01+, P2A_K03+, P2A_W03+, P2A_W04+, R2A_K03+, R2A_U01+, R2A_U06+, R2A_W02+, R2A_W05+,
Codes of learning outcomes in a major area of study: K2A_K03+, K2A_U01+, K2A_U06+, K2A_W02+, K2A_W03+, K2A_W14+,

LEARNING OUTCOMES:**Knowledge**

- W1 - The student has knowledge of the circulation of water in the catchment area and the possibility of its retention.
W2 - The student has knowledge of administrative and legal procedures for the execution of small hydropower projects.
W3 - The student has knowledge of the needs of the technical infrastructure in the field of water management in small catchments, its functions and the effects of lack of infrastructure.

Skills

- U1 - Ability to design water management and protection against extreme hydrological phenomena.
U2 - The ability to determine the proper application of the relevant measures governing the air-water relationship and overwatered soils by both technical as well as phyto-technical and agrotechnical treatments

Social competence

- K1 - The student is aware of the responsibility of proper management of water resources in river basins and the risks resulting from the improper management of water in river basins.

BASIC LITERATURE

- 1) Borcz B., Pogodziński Z, Woda w krajobrazie wiejskim, zagrożenia i ochrona. Monografie, wyd. Wyd. AR Wrocław, 1994, t. 4 ; 2) Ciepeliowski A., Podstawy gospodarowania wodą., wyd. Wydawnictwo SGGW, 1999 ; 3) Pływaczyk A., Gospodarowanie wodą w krajobrazie., wyd. Wyd. AR Wrocław, 2007

SUPPLEMENTARY LITERATURE**Course / module**

Water Resource Management in River Basins

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: facultative**Course group:** C - przedmioty specjalnościowe**ECTS code:** 01956-29-C**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/ masters**Year/Semester:** 1 / 2**Type of course:**

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 10, Auditorium classes: 15**Teaching forms and methods**

Lecture(K1, U1, U2, W1, W2) : Lecture with multimedia presentation, Auditorium classes(K1, U1, U2, W1, W2, W3) : Auditorium exercises, project methodology

Form and terms of the verification results:

LECTURE: Colloquium test - Written test(K1, U1, U2, W1, W2, W3) ;AUDITORIUM CLASSES: Colloquium test - Credit on the basis of correctly performed tasks in the form of a report(K1, U1, U2, W1, W2, W3)

Number of ECTS points: 1,5**Language of instruction** polski**Introductory courses:**

Hydrology, melioration, meteorology

Preliminary requirements:

Knowledge of water drainage issues from the catchment area, formation of water balance

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształowania Środowiska,

Person in charge of the course:

dr inż. Szymon Kobus,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

01956-29-C

WATER RESOURCE MANAGEMENT IN RIVER BASINS

ECTS:1,5

YEAR: 2019Z

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	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparation for classes test	8 h
- preparation for lectures test	7 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,

**WETLAND PROTECTION AND RESTORATION****01056-29-C****ECTS: 1,5****YEAR: 2019Z****COURSE CONTENT
CLASSES:**

Determination of physical and water-physical properties of drained and natural wetlands. Principles of wetland conservation. Methods of active protection of wetlands. Project of conservation tasks and restoration design of chosen wetlands.

LECTURES:

Classification of wetlands. Development of wetlands. Fauna and flora of wetlands. Transformations of wetlands and subsidence of peatlands. Wetland use in Poland and in other parts of the world. The role of wetlands in water circulation and GHGs emissions. Maintenance of water conditions. Wetland conservation. Programs of wetland protection. Restoration of peatlands in Poland. Methods of restoration of wetlands.

EDUCATIONAL OBJECTIVE:

The aim of this course is to present problems of wetland conservation and rational management of these areas.

**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: P2A_K04+, P2A_U01+, P2A_U04+, P2A_U06+, P2A_W01+, P2A_W05+, R2A_K04+, R2A_K05+, R2A_K06+, R2A_U01+, R2A_U04+, R2A_U05+, R2A_W06+,

Codes of learning outcomes in a major area of study: K2A_K04+, K2A_K06+, K2A_K10+, K2A_U04+, K2A_U05+, K2A_U15+, K2A_W06+, K2A_W11+,

LEARNING OUTCOMES:**Knowledge**

W1 - The student possesses knowledge of the role of wetlands in the environment, threats to wetlands and responsible management of wetlands.

W2 - The student possesses knowledge of the current problems of wetland protection.

Skills

U1 - The student can plan restoration activities on wetlands.

U2 - The student can assess the state of wetlands and degree of degradation.

Social competence

K1 - The student identifies the state of the wetland and plans restoration activities.

BASIC LITERATURE

1) Łachacz A., Wetlands - their functions and protections, wyd. UWM w Olsztynie, 2009

SUPPLEMENTARY LITERATURE

1) , Peatlands International, wyd. IPS ; 2) , Wetlands, wyd. Society of Wetland Scientists

Course / module

Wetland Protection and Restoration

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: facultative**Course group:** C - przedmioty specjalnościowe**ECTS code:** 01056-29-C**Field of study:** Environmental Protection**Specjalty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/ masters**Year/Semester:** 1 / 2**Type of course:**

Laboratory classes, Lecture

Number of hours per semester/week: Laboratory classes: 15, Lecture: 10**Teaching forms and methods**

Laboratory classes(null) : Practical classes and field classes, Lecture(W1, W2) : Auditorium

Form and terms of the verification results:

LABORATORY CLASSES: Colloquium test - Open test including issues discussed during lectures and practical classes(U2, W1, W2) ;LABORATORY CLASSES: Project - Evaluation of compatibility of the scope of the project with the criteria presented by the teacher (K1, U1, U2, W2) ;LECTURE: Colloquium test - The test including issues discussed during lectures.(U2, W1, W2)

Number of ECTS points: 1,5**Language of instruction** polski**Introductory courses:**

Soil Science

Preliminary requirements:

-

Name of the organizational unit offering the course:

Katedra Gleboznawstwa i Rekultywacji Gruntów,

Person in charge of the course:

dr inż. Barbara Kalisz,

Course coordinators:**Notes:**

-

Detailed description of the awarded ECTS points - part B

01056-29-C
ECTS:1,5
YEAR: 2019Z

WETLAND PROTECTION AND RESTORATION

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: laboratory classes	15 h
- participation in: lecture	10 h
- consultation	2 h
	27 h

2. Student's independent work:

- preparation for the classes and test	8 h
- preparing presentation of the tasks in the project	7 h
	15 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 42 h : 28 h/ECTS = 1,50 ECTS
average: **1,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,96 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,54 ECTS points,

**AQUATIC ECOSYSTEM PROTECTION**

07256-29-C

ECTS: 2,5

YEAR: 2019L

**COURSE CONTENT
CLASSES:**

Evaluation of the transformation and the level of risks for chosen surface water types – shallow lakes, small water reservoirs and rivers. Development policies of direct catchment area and the banks of the waters bodies for their protection. Technical and biological development designing of rivers and reservoirs. Pro-environmental designing for improvement of the landscape and reduction of pollutants migration into groundwater. Processing of the programs and the assumptions for threatened reservoirs and rivers protection. Assessment of costs, impacts and control needs for undertaken protective actions.

LECTURES:

The concept and criteria for evaluation of natural inland waters. Physical and chemical properties and ecological status of surface water under various severity of human pressure. Ecotones associated with waters in the environment. Ecological basics for natural surface waters restoration. Technical activities conducted in the catchment areas for improving the ecological status of water bodies. Requirements and limitations of natural water conservation. Environmental and economic effects of different water conservation methods. The importance of vegetation in the protection and restoration of water bodies. The impact of conservation measures on water balance and hydrological conditions of the basin. The role of planning in water protection. Examples of objects subjected to various protective actions - their assumptions, implementation process and obtained effects.

EDUCATIONAL OBJECTIVE:

Understanding the mechanisms and effects of natural and anthropogenic transformation of surface water, the acquisition of the ability to assess the needs for renewal of surface water, mastering the methods of the risks and consequences of degradation of surface water, knowledge about technical, planning and biological methods for protection of various water types.

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

Codes of learning outcomes in a major field of study:

InzA_K01+, InzA_U02+, InzA_U03+, InzA_U05+, InzA_W01+, InzA_W02++, InzA_W05+, P2A_K04+, P2A_U01++, P2A_U03+, P2A_W01+, P2A_W04+, P2A_W05+, P2A_W07+, R2A_K04+, R2A_K05++, R2A_K06+, R2A_U01+, R2A_U05+, R2A_U06+, R2A_U07+, R2A_W03+, R2A_W04++, R2A_W05+, R2A_W07+,

Codes of learning outcomes in a major area of study:

K2A_K04+, K2A_K05++, K2A_K06+, K2A_K10+, K2A_U01+, K2A_U05++, K2A_U06+, K2A_U07+, K2A_W03+, K2A_W04+, K2A_W06+, K2A_W07+, K2A_W11+, K2A_W13+, K2A_W14++,

LEARNING OUTCOMES:**Knowledge**

W1 - Knowledge and understanding the impact of the processes and factors that determine the status of natural surface water

W2 - Knowledge of the functioning and effectiveness of different techniques to protect aquatic ecosystems, and their requirements and restrictions

W3 - Knowledge concerning principles of planning and implementation of research using tools and techniques appropriate for the type of surface water

Skills

U1 - Ability to recognize the degree of transformation and the state of naturalness different types of aquatic ecosystems, using conventional methods of assessment

U2 - Ability for preparing of projects and blueprints concerning the protection of aquatic environments, taking into account the needs of the natural and economic constraints

U3 - Ability of forecasting the effects of measures taken for the protection of water

Social competence

K1 - Awareness of the importance to preserve and restore the best obtainable under the circumstances of socio-economic status of natural waters

K2 - Understanding of the need for protection of water and its relation to the evolution of biodiversity and landscape, it is prepared to implement these principles and to educate the public in their environment

BASIC LITERATURE

- 1) Chin D.A., Water-quality engineering in natural systems, wyd. Wiley-John Wiley and Sons Inc., 2006 , s. 610;
- 2) Scheffer M., Ecology of shallow lakes, wyd. Kluwer Academic Publishers, 2004 , s. 357;
- 3) Glińska-Lewczuk K. (ed.), Issues of Landscape conservation and water management in rural areas, wyd. Monograph UWM Olsztyn, 2011 , s. 286

SUPPLEMENTARY LITERATURE

- 1) Smol J.P., Pollution of lakes and rivers, wyd. Blackwell Publishing, 2008 , s. 383;
- 2) Wetzel R.G., Limnology. Lake and river ecosystems, wyd. Elsevier Academic Press, 2000 , s. 1008;
- 3) Pawlaczyk P., Wołejko L., Jermaczek A., Stańko R., Poradnik ochrony mokradeł, wyd. Wyd. Lubuskiego Klubu Przyrodników, Świebodzin,

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.

Course / module

Aquatic Ecosystem Protection

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: mandatory**Course group:** C - przedmioty specjalnościowe**ECTS code:** 07256-29-C**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/ masters**Year/Semester:** 2 / 3**Type of course:**

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 15, Auditorium classes: 30**Teaching forms and methods**

Lecture(K1, K2, W1, W2, W3) ; Auditorium classes(K2, U1, U2, U3, W2, W3) :

Form and terms of the verification results:

LECTURE: Colloquium test - null(K1, K2, U1, W1, W2, W3) ; AUDITORIUM CLASSES: Project - null(K1, K2, U1, U2, U3, W3) ; AUDITORIUM CLASSES: Colloquium test - null(K1, K2, U1, W1, W2, W3)

Number of ECTS points: 2,5**Language of instruction:** polski**Introductory courses:**

Limnology, Freshwater ecology and hydrobiology

Preliminary requirements:

Basic knowledge on limnology and ecology

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształtowania Środowiska,

Person in charge of the course:

dr inż. Andrzej Skwierawski,

Course coordinators:**Notes:**

2002 , s. 272; 4) Kajak Z., Hydrobiologia: limnologia. Ekosystemy wód śródlądowych, wyd. Wyd. Nauk. PWN Warszawa, 2001 , s. 355; 5) Bajkiewicz-Grabowska E., Obieg materii w systemach rzeczno-jeziornych, wyd. Wyd. UW, Warszawa, 2002 , s. 274

Detailed description of the awarded ECTS points - part B

07256-29-C
ECTS:2,5
YEAR: 2019L

AQUATIC ECOSYSTEM PROTECTION

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: auditorium classes	30 h
- participation in: lecture	15 h
- consultation	2 h
	47 h

2. Student's independent work:

- preparation for classes	3 h
- preparation for test of classes material	5,5 h
- preparation for test of lectures material	6 h
- preparing for the final stages of the exercises	6 h
	20,5 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 67,5 h : 27 h/ECTS = 2,50 ECTS
average: **2,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	1,74 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,76 ECTS points,



ENTERPRISE IN ENVIRONMENTAL PROTECTION

13956-20-B

ECTS: 1

YEAR: 2019L

COURSE CONTENT

CLASSES:

-

LECTURES:

The concept of entrepreneurship, entrepreneurial attitudes and characteristics of an entrepreneur, types of businesses, the impact of the market mechanism, analysis of business environment, rules for the preparation of business plans, marketing management, the role of innovations, recognizing market needs in environmental protection, assessment of market potential, risk assessment.

EDUCATIONAL OBJECTIVE:

The course illustrates that profit can be made while serving an environmental cause. This course explores environmental entrepreneurship compared to regular entrepreneurship. The student is anticipated to perceive and enhance market opportunities for entrepreneurs actively working in the environmental protection.

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: P2A_K08+, P2A_U03+, P2A_U11+, P2A_W08+, P2A_W10+, R2A_K08+, R2A_U07+, R2A_W02+, R2A_W09+,

Codes of learning outcomes in a major area of study: K2A_K08+, K2A_U07+, K2A_U12+, K2A_W02+, K2A_W09+,

LEARNING OUTCOMES:

Knowledge

W1 - The student knows the principles of creation and development of individual entrepreneurship forms.

W2 - The student has extensive economical knowledge allowing him/her to start a business in environmental protection.

Skills

U1 - Student is able to plan his/her career.

U2 - Properly assess potential effects of undertaken activities towards solving problems related to environmental protection.

Social competence

K1 - The student is able to think and work in an entrepreneurial way.

BASIC LITERATURE

SUPPLEMENTARY LITERATURE

Course / module

Enterprise In environmental protection

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: mandatory

Course group: B - przedmioty kierunkowe

ECTS code: 13956-20-B

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 2 / 3

Type of course:

Lecture

Number of hours per semester/week: Lecture: 15

Teaching forms and methods

Lecture(K1, U1, U2, W1, W2) : Lecture with multimedia presentation, case study

Form and terms of the verification results:

LECTURE: Colloquium test - Multiple choice test of lectures material(K1, U1, U2, W1, W2)

Number of ECTS points: 1

Language of instruction: polski

Introductory courses:

-

Preliminary requirements:

-

Name of the organizational unit offering the course:

Katedra Agrotechnologii, Zarządzania Produkcją Rolniczą i Agrobiznesu,

Person in charge of the course:

dr inż. Wojciech Truszkowski,

Course coordinators:

Notes:

Detailed description of the awarded ECTS points - part B

13956-20-B
ECTS:1
YEAR: 2019L

ENTERPRISE IN ENVIRONMENTAL PROTECTION

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: lecture	15 h
- consultation	2 h
	17 h

2. Student's independent work:

- preparation for classes	6 h
- preparation for test of lectures material	6 h
	12 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 29 h : 29 h/ECTS = 1,00 ECTS
average: **1 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	0,59 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,41 ECTS points,



ENVIRONMENTAL POLICY

01056-29-B

ECTS: 2,5

YEAR: 2019L

COURSE CONTENT
CLASSES:

Assessment of selected environmental policy measures in terms of their efficiency and effectiveness. Analysis of environmental policy evolutions, with particular emphasis on the protection of biodiversity as well as management of natural resources. Selected issues of the environmental policy (local, regional, national, international) – problem-solving sessions.

LECTURES:

The current state of the natural environment in Poland as a basis for the implementation of environmental policy. Environmental protection concepts. Environmental policy – basic assumptions, objectives, and principles. Evolution of the environmental policy. Environmental protection and sectoral policies. Environmental policy and environmental protection instruments in the European Union. The influence of the integration of Poland with the EU on the environmental policy. Economic consequences of the implementation of environmental policy. Environmental policy instruments. Financing and investments in environmental protection. Responsibility in environmental protection and the tasks of public administration in the field of environmental protection. Social aspects of environmental protection and environmental awareness.

EDUCATIONAL OBJECTIVE:

Learning about the principles of environmental policy development at various levels and presenting information about both the instruments used to achieve the objectives of this policy and implementation problems

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:

P2A_K03++, P2A_K04+, P2A_K05+, P2A_U01+, P2A_U03+, P2A_U07+, P2A_W01+, P2A_W05+, R2A_K03++, R2A_K06+, R2A_K07+, R2A_U01+, R2A_U04+, R2A_U07+, R2A_W06+, R2A_W07+,

Codes of learning outcomes in a major area of study:

K2A_K03++, K2A_K06+, K2A_K07+, K2A_U01+, K2A_U04+, K2A_U07+, K2A_W06+, K2A_W07+, K2A_W11+,

LEARNING OUTCOMES:

Knowledge

- W1 - The student indicates the links between the environmental policy and sectoral policies.
- W2 - Explains the processes of changes to the environmental policy and indicates priority measures.
- W3 - Identifies current problems of the environmental policy.

Skills

- U1 - Student understands political as well as legal and economic determinants of environmental protection.
- U2 - Analyses the causes and effects of changes introduced to the environmental policy.
- U3 - Ocenia sposoby rozwiązywania problemów z zakresu polityki ochrony środowiska i proponuje własne

Social competence

- K1 - The student is able to use knowledge of environmental issues in education and the development of environmental awareness of the public, as well as in resolution of conflicts at various levels in the area of environmental protection through negotiations.
- K2 - The student is also oriented towards pro-environmental measures and is able to identify priorities in environmental policy.
- K3 - The student is aware of the need for changes and the necessity for supplementary education in the field of environmental policy.

BASIC LITERATURE

- 1) Bernaciak A., Gaczek W. M., Ekonomiczne aspekty ochrony środowiska, wyd. Akademii Ekonomicznej w Poznaniu, 2001 ; 2) Małachowski K. (red.), Gospodarka a środowisko i ekologia, wyd. CeDeWu, Warszawa, 2007 ; 3) Ciecchanowicz-McLean J., Prawo i polityka ochrony środowiska, wyd. Oficyna a Wolters Kluwer Business , 2009

SUPPLEMENTARY LITERATURE

- 1) H. Folmer, L. Gabel, H. Opschoor,, Ekonomia środowiska i zasobów naturalnych, wyd. Krupski i S-ka, 1996 ; 2) Dobrzańska B, G. Dobrzański, D. Kielczewski, Ochrona środowiska przyrodniczego, wyd. Naukowe PWN, 2009 ; 3) Graczyk A., A.M. Graczyk., Wprowadzanie mechanizmów rynkowych w ochronie środowiska, wyd. Polskie Wydawnictwo Ekonomiczne, Warszawa, 2011 ; 4) Papuziński A (red.), Polityka ekologiczna III Rzeczypospolitej, wyd. Wydaw. Uczelniane AB, 2000

Course / module

Environmental policy

Fields of education:

Obszar nauk przyrodniczych, Obszar nauk rolniczych, leśnych i weterynaryjnych

Course status: mandatory

Course group: B - przedmioty kierunkowe

ECTS code: 01056-29-B

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 2 / 3

Type of course:

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 30, Auditorium classes: 15

Teaching forms and methods

Lecture(K1, K3, U2, W1, W2, W3) : Lecture including a multimedia presentation, Auditorium classes(K2, K3, U1, U2, U3, W1, W2, W3) : Recitation classes – discussions, problem-solving sessions, problem-based learning

Form and terms of the verification results:

LECTURE: Written test - Written test in the lecture contents – passing with a mark (W1, W2, W3) ;AUDITORIUM CLASSES: Presentation - Presentation - Assessment of work and cooperation in a group 1 – a mark for activity, creativity, and participation in discussions (K1, K2, K3, U1, U2, U3)

Number of ECTS points: 2,5

Language of instruction: polski

Introductory courses:

The economics of environmental protection, environment protection laws

Preliminary requirements:

The knowledge in economics and environmental protections

Name of the organizational unit offering the course:

Katedra Agrotechnologii, Zarządzania Produkcją Rolniczą i Agrobiznesu,

Person in charge of the course:

dr hab. Wojciech Gotkiewicz, prof. UWM

Course coordinators:

Notes:

Detailed description of the awarded ECTS points - part B

01056-29-B
ECTS:2,5
YEAR: 2019L

ENVIRONMENTAL POLICY

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	30 h
- consultation	2 h
	47 h

2. Student's independent work:

- preparation for test of lectures material	10,5 h
- preparing presentations	10 h
	20,5 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 67,5 h : 27 h/ECTS = 2,50 ECTS
average: **2,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	1,74 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,76 ECTS points,



Course / module syllabus - part A

MASTER THESIS

01056-29-C

ECTS: 13

YEAR: 2019L

COURSE CONTENT

CLASSES:

Write a master's thesis and preparation for the diploma exam.

LECTURES:

x

EDUCATIONAL OBJECTIVE:

Gaining deeper knowledge in a range of issues related to the master's thesis topic. Writing a master's thesis and preparation for the diploma exam.

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:

P2A_K01+, P2A_K03+, P2A_K04++, P2A_U01+, P2A_U06+, P2A_W01+, P2A_W04+, P2A_W09+, R2A_K01+, R2A_K03+, R2A_K04+, R2A_U01+, R2A_U04+, R2A_W01+, R2A_W03+, R2A_W05+,

Codes of learning outcomes in a major area of study:

K2A_K01+, K2A_K03+, K2A_K04+, K2A_K10+, K2A_U01+, K2A_U04+, K2A_W01+, K2A_W03+, K2A_W05+, K2A_W12+,

LEARNING OUTCOMES:

Knowledge

W1 - Know the basic principles from the scope of a copyright law and protection of intellectual property and work safety regulations.

W2 - Have knowledge concerning the most important problems in field of environmental protection and development. Fluent in environmental protection terminology.

W3 - Know and understand the methodology principles of research work.

Skills

U1 - Makes use of scientific literature from the scope of environmental development and protection.

U2 - Properly select research methods. Self-planning, conduct, analyze and assesses the correctness of the performed task in the scope of environmental protection.

Social competence

K1 - Understand the need for targeted education and self-improvement in the scope of environmental protection.

K2 - Correctly identify and solve dilemmas related to the environmental protection.

BASIC LITERATURE

1) The original specialized literature self-collected by the student and recommended by the tutor., -, wyd., -, t., s., -

SUPPLEMENTARY LITERATURE

Course / module

Master thesis

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: facultative

Course group: C - przedmioty specjalnościowe

ECTS code: 01056-29-C

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 2 / 3

Type of course:

MA Diploma Seminar

Number of hours per semester/week: MA Diploma Seminar: null

Teaching forms and methods

MA Diploma Seminar(K1, K2, U1, U2, W1, W2, W3) : MASTER'S WORKSHOP/ LABORATORY

Form and terms of the verification results:

MA DIPLOMA SEMINAR: Thesis - Thesis - Presentation of the master's thesis to a tutor. (K1, K2, U1, U2, W1, W2, W3)

Number of ECTS points: 13

Language of instruction: polski

Introductory courses:

lack

Preliminary requirements:

lack

Name of the organizational unit offering the course:

Katedra Mikrobiologii,

Person in charge of the course:

dr inż. Magdalena Zaborowska,

Course coordinators:

Notes:

Detailed description of the awarded ECTS points - part B

01056-29-C
ECTS:13
YEAR: 2019L

MASTER THESIS

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: ma diploma seminar	h
- consultation	80 h
	80 h

2. Student's independent work:

0 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 80 h : 25 h/ECTS = 3,20 ECTS
average: **13 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	3,20 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	9,80 ECTS points,



NATURAL RESOURCES GEOGRAPHY

07056-20-B

ECTS: 3,5

YEAR: 2019L

**COURSE CONTENT
CLASSES:**

Development (graphics and text) of selected components of the geographical environment, social and economic situation of the world: raw material mineral resources and mining (energy resources and metal); unconventional energy sources, location, importance; climate change and water resources, the location of regions as a result of threats of rising sea levels and the occurrence of extreme hydrology and meteorology; water resources of water: the water balance of the continents, the water of the world's oceans, access to drinking water; formations, vegetable cultivation of selected plants; distribution of soils in the world, the structure of land use; demographic situation: the status and distribution of the population.

LECTURES:

: Classification of natural resources. Mineral resources. Mining. Energy in nature. Atmospheric pollution and climatic consequences. Water resources. Multifunctional water. Plant formations. Forest and its functions. Agricultural space. Forms of land use. Man and the environment. Population and demographic issues

EDUCATIONAL OBJECTIVE:

Education awareness of the importance of resources and environmental value for the inhabitants of the Earth and the willingness to work for their protection. Awareness of the variety of negative and positive uses of the human resource environment. Training in critical thinking skills, participating in dialogue, including the presentation of his own position and his defence in relation to the policy pursued towards the natural potential in different parts of the world.

**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: P2A_K02+, P2A_U04+, P2A_U06+, P2A_U07+, P2A_W01+, P2A_W05+, R2A_K05+, R2A_W06+, R2A_W07+,

Codes of learning outcomes in a major area of study: K2A_K02+, K2A_K05+, K2A_U04+, K2A_W06+, K2A_W07+, K2A_W11+,

LEARNING OUTCOMES:**Knowledge**

W1 - The student has a wide range of factual knowledge of current problems of modernity

W2 - Student can distinguish and identify natural environmental resources.

W3 - The student can explain the relationship between the ecological, economic and social spheres.

Skills

U1 - The student knows the ways of obtaining and processing information necessary for the performance of individual subjects in the form of written papers, using teamwork to evaluate the accuracy, credibility and logical consistency between the management of the environment and the economy and anthropogenic influences.

Social competence

K1 - The student is competent in individual and team creativity and is aware of the responsibility for the state of the environment in the context of existential issues of the modern world.

BASIC LITERATURE

1) Feirla I, Repetytorium z geografii gospodarczej, wyd. PWE, 2004; 2) Szlachta J, Niekonwencjonalne źródła energii, wyd. Wyd. AR Wrocław, 1999; 3) Fierla I, Geografia gospodarcza świata, wyd. PWE, 2000; 4) Żylicz T., Żylicz T., wyd. PWE, 2004

SUPPLEMENTARY LITERATURE**Course / module**

Natural resources geography

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: mandatory**Course group:** B - przedmioty kierunkowe**ECTS code:** 07056-20-B**Field of study:** Environmental Protection**Specialty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/masters**Year/Semester:** 2 / 3**Type of course:**

Lecture, Auditorium classes

Number of hours per semester/week: Lecture: 30, Auditorium classes: 15**Teaching forms and methods**

Lecture(K1, U1, W1, W2, W3) : Lectures in the form of multimedia presentations (mainly tables, charts, illustrations, photos, videos), Auditorium classes(K1, U1, W1, W2, W3) :

Form and terms of the verification results:

LECTURE: Written exam - Examination of the lecture content, only after successfully completing the tutorial content (K1, K2, U1, W1, W2, W3)(K1, U1, W1, W2, W3); AUDITORIUM CLASSES: Project - Project - Projects on given topics and multimedia presentation (K1, K2, U1, W1, W2, W3)(K1, U1, W1, W2, W3)

Number of ECTS points: 3,5**Language of instruction** polski**Introductory courses:**

Meteorology and climatology, Geology with geomorphology, Soil science, Hydrology, Biology

Preliminary requirements:

Broad knowledge of physical geography of the world

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształtowania Środowiska,

Person in charge of the course:

dr Monika Panfil,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

07056-20-B
ECTS:3,5
YEAR: 2019L

NATURAL RESOURCES GEOGRAPHY

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	30 h
- consultation	4 h
	49 h

2. Student's independent work:

- preparation for the exam	15,5 h
- preparation of reports and preparation of presentations for exercises.	30 h
	45,5 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 94,5 h : 27 h/ECTS = 3,50 ECTS
average: **3,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	1,81 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	1,69 ECTS points,



01956-20-D

ECTS: 3

YEAR: 2019L

SPECIAL SEMINAR FOR BECHELOR DEGREE STUDENTS**COURSE CONTENT
CLASSES:**

Individual and group work of diploma students: presentation of the selected issues based on the literature. Review of the literature related to the aquatic ecosystem specific issues. Compilation of the information on environmental problems of water ecosystems required for the issues for final exam. Methodology of research within the scope of environmental protection and management. Methodology of master thesis structure (chapters, subchapters, references etc.). Selection of the problem being a subject of M.Sc. thesis. Presentation of the range of methods applied. Writing and graphical skills. Interpretation and verification of the study outcomes, confrontation with the literature. Formulation of conclusions and inferences.

LECTURES:

-

EDUCATIONAL OBJECTIVE:

Preparation of the student to prepare a master's degree thesis and to pass the final examination. The aim of the education is preparation of a diploma student to the research and creative approach of solving water-related problems, including perception and verbalization of water pollution, ecosystem services and management, formulating scientific hypotheses, ability to logical and efficient selection of materials and methods, literature, applying statistics, logical presentation of research outcomes and effective discussion.

**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: P2A_K01+, P2A_K04+, P2A_K05+, P2A_K07+, P2A_U01+, P2A_U09+, P2A_U10+, P2A_W01+, P2A_W03+, P2A_W04+, R2A_K01+, R2A_K05+, R2A_K07+, R2A_U01+, R2A_U08+, R2A_U09+, R2A_W04+, R2A_W06+,

Codes of learning outcomes in a major area of study: K2A_K01+, K2A_K07+, K2A_K10+, K2A_U01+, K2A_U08+, K2A_U09+, K2A_W06+, K2A_W13+,

LEARNING OUTCOMES:**Knowledge**

W1 - The student has knowledge of scientific methodologies. She/he possesses knowledge concerning the most important problems in the field of water resource protection and development. Knows and understands the methodology principles of research work. She/he is familiar with statistical analyses of the results and properly formulates conclusions. The student knows the methodology and rules of master thesis preparation, the basic principles of copyright law and protection of intellectual property and work safety regulations.

Skills

U1 - The student is able to apply the methodological principles in his/her research work. She/he is familiar with statistical analyses to properly analyse the results and infer conclusions.
U2 - The student skilfully complies and interprets the results of the research outcomes and compares them with the literature.

Social competence

K1 - The student is prepared for research work and understands the need for constant life-long learning.
K2 - She/he has got the ability to plan, inspire, work in groups. She/he is able to use the achieved knowledge in teamwork following legal and ethical principles.

BASIC LITERATURE

1) Glatthom, A.A., Writing the winning thesis or dissertation: A step-by-step guide. , wyd. Thousand Oaks,, 2005 ; 2) Brown, R. , Doing your dissertation in business and management: The reality of researching and writing. , wyd. SAGE, 2006

SUPPLEMENTARY LITERATURE

1) Varia, Relevant literature/ articles published in enviornmental engineering , wyd. varia, 200x

Course / module

Special seminar for beachelor degree students

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: facultative**Course group:** D - przedmioty specjalizacyjne**ECTS code:** 01956-20-D**Field of study:** Environmental Protection**Specjalty area:** Aquatic Ecosystem Protection**Educational profile:** General academic**Form of study:** Stacjonarne**Level of study:** Drugiego stopnia/ masters**Year/Semester:** 2 / 3**Type of course:**

Diploma seminar

Number of hours per semester/week: Diploma seminar: 45**Teaching forms and methods**

Diploma seminar(null) : Presentation, multimedia presentation, analysis of papers and presentations, discussion.

Form and terms of the verification results:

DIPLOMA SEMINAR: Evaluation of the work and cooperation in the group - Evaluation of presentations, speeches and activities in discussion.(K1, K2, U1, U2, W1) ;DIPLOMA SEMINAR: Presentation - Presentation (literature analysis, multimedia, oral) - Substantive evaluation of content and presentation.(U1, U2, W1)

Number of ECTS points: 3**Language of instruction** polski**Introductory courses:**

-

Preliminary requirements:

-

Name of the organizational unit offering the course:

Katedra Gospodarki Wodnej, Klimatologii i Kształowania Środowiska,

Person in charge of the course:

prof. dr hab. inż. Katarzyna Glińska-Lewczuk,

Course coordinators:**Notes:**

Detailed description of the awarded ECTS points - part B

01956-20-D
ECTS:3
YEAR: 2019L

SPECIAL SEMINAR FOR BECHELOR DEGREE STUDENTS

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: diploma seminar	45 h
- consultation	0 h
	45 h

2. Student's independent work:

- collection and analysis of literature	15 h
- preparing speeches and presentations	15 h
	30 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 75 h : 25 h/ECTS = 3,00 ECTS
average: **3 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	1,80 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	1,20 ECTS points,



VALORISATION OF WETLAND AREAS

13056-26-C

ECTS: 2,5

YEAR: 2019L

COURSE CONTENT
CLASSES:

Research project - valorisation of a chosen area based on data from nature inventory: abiotic conditions, relief, hydrography, soil cover, plant cover, including indicator species characteristic for various syntaxons of plant communities, plant species used for valorisation (keystone species, plant species under legal protection, endangered, rare). Proposals for protection of an investigated site, including elaboration of rules of active protection, elaboration of expert reports to establish legally protected areas.

LECTURES:

Characteristic features of wetlands. Classification of wetlands. Main kinds of wetlands. Functions of wetlands. Wetlands in land-use plans. Selected methods used in evaluation of environment. Unique versus typical wetland sites. Sources of information useful during performing survey, inventory and valorisation of nature. Legal regulations of nature protection. General inventory of nature for rural districts. Rules of conservation and protection of nature. Valorisation methods of areas valuable from nature protection point of view. Examples of protection plans for various sites and areas (nature reserves, landscape parks, ecological sites, nature monuments, etc.)

EDUCATIONAL OBJECTIVE:

Acquisition of knowledge and practical experience in performing valorisation of wetlands. Acquisition of knowledge about various kinds of wetlands and their functions in rural landscape

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: P2A_U02+, P2A_U09+, P2A_W01+, P2A_W02+, P2A_W04+, R2A_K04+, R2A_K05+, R2A_U01+, R2A_U08+, R2A_W03+, R2A_W06+,

Codes of learning outcomes in a major area of study: K2A_K04+, K2A_K10+, K2A_U01+, K2A_U08+, K2A_U11+, K2A_W03+, K2A_W06+,

LEARNING OUTCOMES:

Knowledge

W1 - The student has mastered selected methods of collection information concerning environmental conditions and is able to process and evaluate information originating from various sources and own field observations in order to assess the quality of wetlands. The student is able to carry out a field survey of wetlands and is ready to evaluate the obtained results from a nature protection point of view.

Skills

U1 - The student is able to select appropriate methods of nature inventory depending on local conditions and knows how to conform forms of nature protection to the existing needs of society. The student is also able to gain the required information and is able to reconsider opinions.

Social competence

K1 - The student appreciates landscape diversity as well as biotic diversity and is careful about threats to nature and is able to undertake steps towards nature protection on a local scale in accordance with the laws in force.

BASIC LITERATURE

1) Dubel K., Uwarunkowania przyrodnicze w planowaniu przestrzennym, wyd. Wydawnictwo Ekonomia i Środowisko, Białystok, 2000, s. 160; 2) Obidziński A., Żelazo J. (red.), Inwentaryzacja i waloryzacja przyrodnicza. Przewodnik do ćwiczeń terenowych, wyd. Wydawnictwo SGGW, Warszawa, 2004, s. 106; 3) Pawlaczek P., Wołejko L., Jermaczek A., Stańko R., Poradnik ochrony mokradeł, wyd. Wydawnictwo Lubuskiego Klubu Przyrodników, Świebodzin, 2001, s. 272

SUPPLEMENTARY LITERATURE

1) Pawlaczek P., Jermaczek A., Poradnik lokalnej ochrony przyrody. Wydanie IV zmienione, wyd. Wydawnictwo Lubuskiego Klubu Przyrodników, Świebodzin, 2009, s. 392; 2) Symonides E., Ochrona przyrody, wyd. Wydawnictwo Uniwersytetu Warszawskiego, Warszawa, 2007, s. 767

Course / module

Valorisation of wetland areas

Fields of education:

Obszar nauk rolniczych, leśnych i weterynaryjnych, Obszar nauk przyrodniczych

Course status: mandatory

Course group: C - przedmioty specjalnościowe

ECTS code: 13056-26-C

Field of study: Environmental Protection

Specialty area: Aquatic Ecosystem Protection

Educational profile: General academic

Form of study: Stacjonarne

Level of study: Drugiego stopnia/ masters

Year/Semester: 2 / 3

Type of course:

Laboratory classes, Lecture, Field classes

Number of hours per semester/week: Laboratory classes: 20, Lecture: 15, Field classes: 10

Teaching forms and methods

Laboratory classes(null) : Valorization project, Lecture(K1, U1, W1) : Lectures with Power Point presentation., Field classes(null) :

Form and terms of the verification results:

LABORATORY CLASSES: Project - Valorization project of chosen area(K1, U1, W1) ;LECTURE: Written test - Test covering lectures materials(K1, U1, W1)

Number of ECTS points: 2,5

Language of instruction: polski

Introductory courses:

botany, ecology, geography, soil science, hydrography

Preliminary requirements:

completed first stage of university education

Name of the organizational unit offering the course:

Katedra Gleboznawstwa i Rekultywacji Gruntów,

Person in charge of the course:

prof. dr hab. Andrzej Łachacz,

Course coordinators:

Notes:

Detailed description of the awarded ECTS points - part B

13056-26-C
ECTS:2,5
YEAR: 2019L

VALORISATION OF WETLAND AREAS

The awarded number of ECTS points is composed of:

1. Contact hours with the academic teacher:

- participation in: field classes	10 h
- participation in: laboratory classes	20 h
- participation in: lecture	15 h
- consultation	2 h
	47 h

2. Student's independent work:

- preparation for test of lectures material	10 h
- preparing presentation of done project	10,5 h
	20,5 h

1 ECTS point = 25-30 h. of the average student's work, number of ECTS points = 67,5 h : 27 h/ECTS = 2,50 ECTS
average: **2,5 ECTS**

- including the number of ECTS points for contact hours with direct participation of the academic teacher:	1,74 ECTS points,
- including the number of ECTS points for hours completed in the form of the student's independent work:	0,76 ECTS points,