IV. wzór opisu modułu kształcenia/przedmiotu (sylabus).

Opis modułu kształcenia / przedmiotu (sylabus)

Rok akademicki:		Grupa przedmiotów:		Numer katalogowy:	

Nazwa przedmiotu[1]:	**Infrastruktura ekologiczna w krajobrazie rolniczym**			**ECTS** [2]	**2**
Tłumaczenie nazwy na jęz. angielski[3]:	**Ecological infrastructure in agriculture landscape**				
Kierunek studiów[4]:	**Environmental Protection**				
Koordynator przedmiotu[5]:	**dr. Arkadiusz Przybysz**				
Prowadzący zajęcia[6]:	**dr. Marta Stankiewicz-Kosyl**				
Jednostka realizująca[7]:	**Laboratory of Basic Research in Horticulture, Faculty of Horticulture and Landscape Architecture**				
Wydział, dla którego przedmiot jest realizowany[8]:	**Faculty of Civil and Environmental Engineering**				
Status przedmiotu[9]:	a) przedmiot: **Specialization**	b) stopień: **2** rok: **1**		c) **Stationary**	
Cykl dydaktyczny[10]:		Jęz. wykładowy[11]: **English**			
Założenia i cele przedmiotu[12]:	Intensive and conventional plant production have a dramatic impact on landscape quality and biodiversity. Protection of natural environment, including ecological crop production, is one of EU priorities for which financial support is still augmenting. Polish farmers together with scientists working in environment design and protection have to cope with the necessity of introducing changes in the structure of farm and countryside landscape, e.g. establishing of mandatory 7 percent of uncultivated land. They have to be prepared to utilize those new conditions with the greatest possible benefits for themselves and surrounding environment. Conventional plant production might be also one of the reasons for mass appearance of pests and herbicide resistant weeds. Therefore many attempts are made, and will be taken in the future, to enhance the quantity and quality of semi-natural elements in the countryside. It is, among others, response to the demand for high-quality and healthy food without chemical residues, which will be produced in an attractive and biodiversity rich environment. The course aims at acquisition by students the current knowledge about optimization of ecological infrastructure of farms and surrounding environment in accordance with the guidelines of the PROW and the EU.				
Formy dydaktyczne, liczba godzin[13]:	a) **Lectures**; liczba godzin **15**; b) **Seminary classes**; liczba godzin **8**; c) **Laboratory classes**; liczba godzin **5**; d) **Field classes**; liczba godzin **2**;				
Metody dydaktyczne[14]:	**Individual students projects, consultation, discussion, problem solving, audio-visual methods**				
Pełny opis przedmiotu[15]:	Lectures: Students will be introduced to important species of flora as well as ecosystem and landscape diversity in the countryside. The most valuable and beneficial natural plant habitats, such us low intensive grasslands, litter meadows, woodland patches and other agricultural areas of high ecological value will be characterized and methods of their establishment and maintenance will be provided. Guidelines and opportunities for financial support according to PROW and EU law will be presented. Students will be also acquainted with key representatives of beneficial vertebrates (amphibians, reptiles, birds and mammals) and naturally occurring enemies of crop pests. Emphasis will be focused on their useful role in farms neighbourhood, habitat and food preferences - methods promoting their presence, protection and activity will be presented. Methods of maintenance and protection of endangered species of flora and fauna will be presented, especially in the context of EU subsidies. Course of lectures will aim at increasing of students sensitivity to the problems of biodiversity and mutual relationships occurring between the world of plants and animals.				

	Practices: Practice classes will describe the most important types of ecological infrastructure (hedges, conservation headlands, wildflower strips and rotational fallows), the methods of their establishment and improvement. Students will learn how to evaluate their quality (seed bank), about their role in agroecosystem and differences in their utilization in various types of farms (fruit, vegetables and others) and human settlements. The network of ecological infrastructure is composed of three basic elements different in size and functions: large habitats, smaller habitats ("stepping stones") and corridor structures. Large surfaces are serving as large and permanent habitats. Stepping stones habitats are composed of rather concentrated and small sized structures, which allows the build-up of temporary beneficial organism population. Corridor elements exhibit linear and stripe-like structures assist animal species in moving between large habitats and small stepping stones. During exercises students will learn in practice (individual projects) how to asses and improve ecological infrastructure of the farm together with enhancement of biological diversity. Leading idea of the projects is to maximize the potential of uncultivated land, which in future will have to cover 7% of each farm. Pollinators, especially wild species (solitary bees and bumblebees), their habitat and food (honey and pollen plants) preferences, biology of development will be characterized. This knowledge will help students to understand benefits of presence of these organisms in countryside.
Wymagania formalne (przedmioty wprowadzające)[16)]:	**Botany, Environment protection, Ecology, Soil science, Entomology**
Założenia wstępne[17)]:	**Student should (i) have knowledge obtained from introductory subjects, (ii) be able to work in group, (iii) be able to demonstrate results of work in oral presentation and (iv) have basic skills in MS Office PowerPoint and simple graphics tools.**
Efekty kształcenia[18)]:	**1. W01 - Knowledge about the types of ecological infrastructure and most valuable natural plant habitats.** **2. W02 - Knowledge about flora and fauna of countryside and mutual relationships occurring between the world of plants and animals.** **3. W03 - Knowledge about the basic acts of law important for ecological infrastructure of farms and their immediate surroundings.** **4. U01 - Ability to evaluate of current state of ecological infrastructure of farms, together with their immediate surroundings.** **5. U02 - Ability to optimize the ecological infrastructure of farms and their immediate surroundings.** **6. K01 - Increased sensitivity to the problems associated with biodiversity.**
Sposób weryfikacji efektów kształcenia[19)]:	**During examination students will have to (i) defend their own projects concerning improvement of ecological infrastructure of selected farm or countryside area (ii) and pass oral exam composed of 3 questions.**
Forma dokumentacji osiągniętych efektów kształcenia [20)]:	**Archived files with students presentations.**
Elementy i wagi mające wpływ na ocenę końcową[21)]:	**1-3. Defence of individual projects – 50%** **4-5. Oral exam – 50%**
Miejsce realizacji zajęć[22)]:	**Lecture room, 2h in the field**

Literatura podstawowa i uzupełniająca[23)]:

1. Literature:

1. Boller E.F., Häni F., Poehling H-M. 2004. Ecological Infrastructures. Ideabook on Functional Biodiversity at the Farm Level. Swiss Centre for Agricultural Extension and Rural Development (LBL), Eschikon, Switzerland. ss. 221
2. Bałazy S., Gmiąt A. (red.) 2007. Ochrona środowiska rolniczego w świetle programów rolno-środowiskowych Unii Europejskiej. Małopolski Ośrodek Doradztwa Rolniczego, Zakład Badań Środowiska Rolniczego i Leśnego PAN w Poznaniu, Instytut Nauk o Środowisku Uniwersytetu Jagiellońskiego w Krakowie. ss. 206.
3. Stankiewicz M., Gadamski G., Gawroński S. W. 2001. Genetic variation and phylogenetic relationships of triazine-resistant and triazine-susceptible biotypes of Solanum nigrum - analysis using RAPD markers. Weed Research 41(4):287-300.
4. Żarska B. 2005. Ochrona krajobrazu. Wyd. III zmienione. Wyd. SGGW, Warszawa, ss. 252.
5. Kruszewicz A. G. 2011. Ptaki Polski Tom 1 i 2. Wyd. Multico, ss. 392+264
6. Organizmy pożyteczne w środowisku rolniczym. 2008. Red. Tomalak M, Sosnowska D. IORPIB, Poznań
7. Trojanowski R., Kużniak S., Kujawa K., Jerzak L. 2009. Ekologia ptaków krajobrazu rolniczego. Bogucki Wydawnictwo Naukowe, Poznań.

2. List of publications related thematically with the subject:

Reviewed publications:

PRZYBYSZ A. WROCHNA M. SŁOWIŃSKI A. GAWROŃSKA H. 2010. Stimulatory effect of Asahi SL on selected plant species. Acta Sci. Pol., Hortorum Cultus 9 (2): 53-64.

EVANS KM, A PATOCCHI, F REZZONICO, F MATHIS, CE DUREL, F FERNÁNDEZ-FERNÁNDEZ, A BOUDICHEVSKAIA, F DUNEMANN, **M STANKIEWICZ-KOSYL**, L GIANFRANCESCHI, M KOMJANC, M LATEUR, M MADDURI, Y NOORDIJK, WE VAN DE WEG. (2011) Genotyping of

pedigreed apple breeding material with a genome-covering set of SSRs: trueness-to-type of cultivars and their parentages. *Molecular Breeding,* 28:535-547.

KOUASSI AB, CE DUREL, F COSTA, S TARTARINI, E VAN DE WEG, K EVANS, F FERNÁNDEZ-FERNÁNDEZ, C GOVAN, A BOUDICHEVSKAJA, F DUNEMANN, A ANTOFIE, M LATEUR, **M STANKIEWICZ-KOSYL**, A SOSKA, K TOMALA, M LEWANDOWSKI, K RUTKOWSKI, E ZURAWICZ, W GUERRA, F LAURENS. 2009. Estimation of genetic parameters and prediction of breeding values for apple fruit quality traits using pedigreed plant material in Europe. *Tree Genetics and Genomes*, 5, 659-672.

PATOCCHI A, F FERNÁNDEZ-FERNÁNDEZ, K EVANS, D GOBBIN, F REZZONICO, A BOUDICHEVSKAIA, F DUNEMANN, **M STANKIEWICZ-KOSYL**, F MATHIS-JEANNETEAU, CE DUREL, L GIANFRANCESCHI, F COSTA, C TOLLER, V COVA, D MOTT, M KOMJANC, E BARBARO, L KODDE, E RIKKERINK, C GESSLER, WE VAN DE WEG. 2009. Development and test of 21 multiplex PCRs composed of SSRs spanning most of the apple genome. *Tree Genetics and Genomes*, 5 (1), 211-223.

HAWLICZEK A., **STANKIEWICZ-KOSYL M.**, GAWROŃSKI S. W. 2007. Wykorzystanie markerów SSR do molekularnej charakterystyki zasobów genowych jabłoni. Roczniki Akademii Rolniczej w Poznaniu 41: 315-319.

Chapters in monographs:

PRZYBYSZ A. GAWROŃSKA H. SŁOWIŃSKI A. 2008. The effect of Asahi SL on growth, efficiency of photosynthetic apparatus and yield of field grown oil seed rape. Monographs series: Biostimulators in modern agriculture, Field Crops. Wieś Jutra, 7-17.

Conference materials :

POPEK R. GAWROŃSKA H. **PRZYBYSZ A**. BAKERA B. GAWROŃSKI S.W. 2010. Capacity of several tree species and *Chlorophytum comosum* Thunb. for PM accumulation. 7th Phytotechnologies Conference – Phytotechnologies in the 21st century: Remediation-Energy-Health-Sustainability. 26-29 September 2010, Parma, Italy, 219.

DZIERŻANOWSKI K. **PRZYBYSZ A**. GAWROŃSKI S. W. 2011. Metals in soil and plants growing on the vicinity of railroad tracks. Actual environmental problems. Proceedings of the International conference of young scientists, graduates, master and PhD students. 10-11 November, Minsk, Republic of Belarus, 67-68.

Other:

MARKOWSKI J. **PRZYBYSZ A**. GAWROŃSKI S. 2010: Wykorzystanie Boczniaka ostrygowatego *Pleurotus ostreatus* L. do bioremediacji zanieczyszczeń ropopochodnych. W: Podstawy Biotechnologii Środowiskowej - trendy, badania, implementacje - tom III. Katedra Biotechnologii Środowiskowej Politechniki Śląskiej w Gliwicach, 219-225.

UWAGI[24]:

Wskaźniki ilościowe charakteryzujące moduł/przedmiot[25] :

Szacunkowa sumaryczna liczba godzin pracy studenta (kontaktowych i pracy własnej) niezbędna dla osiągnięcia zakładanych efektów kształcenia[18] - na tej podstawie należy wypełnić pole ECTS[2]:	**56 h (2,2 ECTS)**
Łączna liczba punktów ECTS, którą student uzyskuje na zajęciach wymagających bezpośredniego udziału nauczycieli akademickich:	**1,2 ECTS**
Łączna liczba punktów ECTS, którą student uzyskuje w ramach zajęć o charakterze praktycznym, takich jak zajęcia laboratoryjne, projektowe, itp.:	**0,9 ECTS**

Tabela zgodności kierunkowych efektów kształcenia efektami przedmiotu [26]

Nr /symbol efektu	Wymienione w wierszu efekty kształcenia:	Odniesienie do efektów dla programu kształcenia na kierunku
01	**W01 - Knowledge about the types of ecological infrastructure and most valuable natural plant habitats.**	K_W06++, K_W07+++
02	**W02 - Knowledge about flora and fauna of countryside and mutual relationships occurring between the world of plants and animals.**	K_W01+, K_W07++
03	**W03 - Knowledge about the basic acts of law important for ecological infrastructure of farms and their immediate surroundings.**	K_W06+, K_W08+
04	**U01 - Ability to evaluate of current state of ecological infrastructure of farms, together with their immediate surroundings.**	K_U04++
05	**U02 - Ability to optimize the ecological infrastructure of farms and their immediate surroundings.**	K_U09+, K_U10++, K_U11++
06	**K03 - Increased sensitivity to the problems associated with biodiversity.**	K_S04++, K_S05, K_S07+++