Micropropagation of rare domestic medicinal plants

Nazwa kierunku studiów	Zielarstwo i Fitoprodukty
Nazwa modułu, także nazwa w języku angielskim	**Micropropagation of rare domestic medicinal plants** **Mikrorozmnażanie rzadkich krajowych roślin leczniczych**
Język wykładowy	English
Rodzaj modułu	Optional/elective
Poziom studiów	Second degree/ master
Forma studiów	stationary
Rok studiów dla kierunku	II
Semestr dla kierunku	2
Liczba punktów ECTS z podziałem na kontaktowe/niekontaktowe	6 (3,04/2,96)
Tytuł naukowy/stopień naukowy, imię i nazwisko osoby odpowiedzialnej za moduł	dr inż. Marzena Parzymies
Jednostka oferująca moduł	Institute of Horticultural Production
Cel modułu	To acknowledge students with biotechnological methods of introducing rare and endangered species of medicinal plants into production and cultivation in vitro.
Efekty uczenia się dla modułu to opis zasobu wiedzy, umiejętności i kompetencji społecznych, które student osiągnie po zrealizowaniu zajęć.	Wiedza:
	1. The student knows and understands the possibilities of cultivation of endangered and rare species of medicinal plants that are present in natural sites and knows the possibilities of using the plant material obtained from in vitro cultures.
	2. The student knows and understands the issues of experiments and methods used in planning the production of medicinal plants from natural sites in tissue cultures and in order to optimize the in vitro cultivation.
	3. The student knows and understands the issues related to running a tissue culture laboratory and production of protected or rare plant species with in vitro methods, in the legal and economic aspect.
	Umiejętności:
	1. The student is able to apply known techniques and methods of in vitro cultivation of medicinal plants in order to introduce into the production plant material derived from plants present in natural habitat.
	2. The student is able to plan and conduct an experiment regarding the optimization of in vitro cultivation of medicinal plants, correctly draw conclusions based on the obtained results and observations, and data from scientific literature.
	3. The student is able to plan and manage the process of production of medicinal plant species from natural sites.
	Kompetencje społeczne:
	1. The student is ready to expand knowledge in the field of production and cultivation of medicinal plants using in vitro methods, based on the latest scientific findings.
	2. The student is ready to popularize the possibility of using medicinal plants of in vitro origin as a source of healthy and good quality raw materials and phytoproducts.
Wymagania wstępne i dodatkowe	Eksperyment w doświadczalnictwie przyrodniczym
Treści programowe modułu	Lectures: Cultivation and propagation of medicinal plants in in vitro cultures, types of cultures and cultivation conditions, possibilities of using plants cultivated in vitro, advantages and disadvantages of plant production in tissue cultures, factors

	affecting the growth and development of plants in vitro, the use of biotechnological methods to obtain compounds from selected species of medicinal plants, adaptation of in vitro cultivation to the habitat requirements of plant species, legal aspects of in vitro cultivation, costs related to the cultivation of plants in in vitro cultures. Classes: initiation, stabilization, observation and characterization of the growth phases and biomass production in selected types of medicinal plant cultures, determination of biomass and growth factor in the tested cultures, analysis of achievements in the field of methods of using medicinal plants occurring in natural positions in in vitro cultivation (case study), developing a project based on an independent, critical review of the current literature on the subject in order to develop a method for cultivating selected species of medicinal plants in in vitro cultures.
Wykaz literatury podstawowej i uzupełniającej	**Literatura podstawowa:** 1. Biotechnology for medicinal plants, micropropagation and improvement. 2013, eds. Chandra, Suman, Lata, Varma, Ajit. Springer, Verlag. 2. Plant tissue culture: propagation, conservation and crop improvement. 2016. Anis, Mohammad, Ahmad, Naseem (eds.). Springer, Verlag. **Literatura uzupełniająca:** 3. Plant Tissue Culture, Techniques and Experiments. 2013. Smith R. Elsevier, Croydon. London. 4. Plant tissue culture. 2015. Sharma V., Alam A. I.K. International Publishing House Pvt. Ltd. New Delhi,India. 5. Monographs, scientific original articles on the biotechnology of medicinal plants and the acquisition of active compounds by biotechnological methods from the library databases of the University of Life Sciences in Lublin.
Planowane formy/działania/metody dydaktyczne	Lecture with the use of multimedia methods and films, demonstration, auditorium and laboratory exercises, individual and team practical tasks related to the cultivation of herbal plants using in vitro methods.
Sposoby weryfikacji oraz formy dokumentowania osiągniętych efektów uczenia się	W1, W2, W3, U1, U2, U3: Exam - written test on theory and practical skills and assessment of knowledge on techniques and materials. U1, U2: assessment of the practical task, the correctness of the work done. U2: evaluation of the presentation of the project on in vitro cultivation of a selected species of medicinal plant. U1, U2, U3: assessment of partial, written credits. K1, K2: assessment of the student's work and commitment during classes, including attendance, activity, independence and reliability during practical classes, preparation for classes.
Elementy i wagi mające wpływ na ocenę końcową	The final grade results from the weighted average obtained from the following elements: Exam - 50% Practice during class - 50%, which consists of: Evaluation of practical work - 30% Project evaluation - 30% Grade from credits - 30% Evaluation of the student's individual and team work - 10% Based on the average, the following final grades are awarded: 4,75-5,0 very good (5) 4,25-4,74 fairly good (4+) 3,75- 4,34 good (4) 3,25 – 3,74 satisfactory plus (3+)

	3,0-3,24 satisfactory (3) < 3,0 unsatisfactory (2)
Bilans punktów ECTS	Form of classes — Number of hours — Points ECTS **Number of contact hours** Lectures — 25 — 1.00 Classes — 25 — 1.00 Consultations — 2 — 0.08 Observations of tissue cultures — 12 — 0.48 Laboratory works — 10 — 0.40 Exam — 2 — 0.08 **Total of contact hours — 76 — 3.04** **Number of non-contact hours** Self-preparation for classes — 12 — 0.80 Self-preparation for written exam — 12 — 0.56 Data reading — 14 — 0.80 Preparation of presentation — 14 — 0.72 Observations — 14 — 0.64 Microscopic observations — 8 — 0.32 Collection of plant material — 4 — 0.16 **Total of non-contact hours — 74 — 2.96** **Total/ points ECTS — 150 — 6.00**
Nakład pracy związany z zajęciami wymagającymi bezpośredniego udziału nauczyciela akademickiego	participation in lectures – 25 h participation in classes – 25 h consultations – 2 h observations of tissue cultures – 12 h laboratory works – 10 h exam – 2 h
Odniesienie modułowych efektów uczenia się do kierunkowych efektów uczenia się	Kod efektu modułowego – kod efektu kierunkowego W1 – ZF_W01 W2 – ZF_W03 W3 – ZF_W04 U1 – ZF_U01 U2 – ZF_U02, ZF_U04 U3 – ZF_U03 K1 – ZF_K02 K2 – ZF_K03