

KARTA PRZEDMIOTU**I. Dane podstawowe**

Nazwa przedmiotu	Kultury komórkowe i tkankowe roślin i zwierząt
Nazwa przedmiotu w języku angielskim	Cultures of plant and animal cells and tissue
Kierunek studiów	Biotechnologia
Poziom studiów (I, II, jednolite magisterskie)	I
Forma studiów (stacjonarne, niestacjonarne)	stacjonarne
Dyscyplina	biotechnologia
Język wykładowy	Grupy w języku polskim – język polski Grupy w języku angielskim – język angielski

Koordinator przedmiotu/osoba odpowiedzialna	Dr hab. Ewa Skórzyńska-Polit
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Forma zajęć (<i>katalog zamknięty ze słownika</i>)	Liczba godzin	semestr	Punkty ECTS
wykład	30	V, VI	4
konwersatorium			
ćwiczenia	45	V, VI	
laboratorium			
warsztaty			
seminarium			
proseminarium			
lektorat			
praktyki			
zajęcia terenowe			
pracownia dyplomowa			
translatorium			
wizyta studyjna			

Wymagania wstępne	Knowledge from the courses of: Basics cytology and physiology and ontogenesis, Plant physiology, Animal physiology, General chemistry, Biochemistry with enzymology.
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II. Cele kształcenia dla przedmiotu

To familiarize students with the methodology of work in the plant tissue culture laboratory, types of cell and tissue cultures, different methods and conditions of <i>in vitro</i> cultures.
Indication of the possibility of using plant cell and tissue culture in industry, agriculture and medicine.

III. Efekty kształcenia dla przedmiotu wraz z odniesieniem do efektów kierunkowych

Symbol	Opis efektu przedmiotowego	Odniesienie do efektu kierunkowego
WIEDZA		
W_01	The student knows the types of <i>in vitro</i> cultures that can be used to obtain biologically active substances, and the principles of obtaining and sterilizing biological material	K_W08
W_02	Student have knowledge about the possible use of cell and tissue cultures in biotechnology, as well as in other fields of science and industry	K_W02, K_W05
W_03	Has knowledge about the role of genetics and molecular techniques in practical <i>in vitro</i> plant cultivation and animal cell research	K_W07
UMIĘTNOŚCI		
U_01	Student is able to isolate cells from biological materials and set up primary cultures, as well as select and prepare culture media	K_U01, K_U04
U_02	He becomes familiar with working in a laminar flow chamber under sterile conditions. Student is able to cultivate cells of different growth modes (adherent, cells growing in suspension), to passage them and assess the condition of the culture, as well as to prepare the cells for storage.	K_U01, K_U02, K_U04, K_U05
U_03	Student conducts experiments based on the initiation of callus on the primary explant and trigger shoots and root organogenesis in callus and explants cultures. Prepares various types of animal cell cultures	K_U04, K_U05
U_04	Student prepares a written description on the experiments and problems related to <i>in vitro</i> culture.	K_U10
KOMPETENCJE SPOŁECZNE		
K_01	The student is interested in further development of knowledge towards the use of cell and tissue culture in various fields of science	K_K01
K_02	The student demonstrates responsibility for the entrusted equipment and respect for their own work and the whole group	K_K02
K_03	He acquires appropriate habits to work in tissue culture laboratory and in sterile conditions. Student proceeds according to work safety regulations.	K_K03

IV. Opis przedmiotu/ treści programowe

Characterization of cell and tissue culture (different types of tissue cultures, culture conditions, culture media, growth regulators). Preparation of culture media. Ingredients of the culture media. Growth regulators used in tissue cultures. Sterilization of biological material, autoclaving, principles of sterile work. Design and equipment for the cell culture laboratory. Regeneration and propagation of plants in *in vitro* culture-micropropagation. Designing a laboratory of cell and tissue cultures. Cell culture conditions, cell culture media, decontamination. Storage of biological material, cryopreservation. Cell lines - derivation, cell banks, criteria for selecting a cell line for experiments. Biological, chemical and physical methods of introducing genes into cells, transfection. Monoclonal antibodies - formation and application in analytics and treatment. Assessment of cell viability and morphology using staining. Preparation of cells for cryopreservation.

V. Metody realizacji i weryfikacji efektów kształcenia

Symbol efektu	Metody dydaktyczne (lista wyboru)	Metody weryfikacji (lista wyboru)	Sposoby dokumentacji (lista wyboru)
WIEDZA			
W_01	Conventional lecture, Conversational lecture	Exam / Written test	Evaluated test / written test
W_02	Conventional lecture, Conversational lecture	Exam / Written test	Evaluated test / written test
W_03	Conventional lecture, Conversational lecture	Exam / Written test	Evaluated test / written test
UMIEJĘTNOŚCI			
U_01	Laboratory classes	Report	Report printout/ report file
U_02	Laboratory classes	Report	Report printout/ report file
U_03	Laboratory classes	Report	Report printout/ report file
U_04	Laboratory classes	Report	Report printout/ report file
KOMPETENCJE SPOŁECZNE			
K_01	Laboratory classes	Observation	Observation report
K_02	Laboratory classes	Observation	Observation report
K_03	Laboratory classes	Observation	Observation report

VI. Kryteria oceny, wagi...

The marks from the written exam/test, colloquium as well as reports and observations are taken into account. The indicated level of knowledge applies to each assessed element.

Mark	Evaluation criteria	
very good (5)	the student realizes the assumed learning outcomes at a very good level	the student demonstrates knowledge of the education content at the level of 91-100%
over good (4.5)	the student accomplishes the assumed learning outcomes an over good level	the student demonstrates knowledge of the education content at the level of 86-90 %
good(4)	the student accomplishes the assumed learning outcomes at a good level	the student demonstrates knowledge of the education content at the level of 71-85%
quite good(3.5)	the student accomplishes the assumed learning outcomes at a quite good level	the student demonstrates knowledge of the education content at the level of 66-70%

sufficient (3)	the student accomplishes the assumed learning outcomes at a sufficient level	the student demonstrates knowledge of the education content at the level of 51-65%
insufficient (2)	the student accomplishes the assumed learning outcomes at an insufficient level	the student demonstrates knowledge of the education content below the level of 51%

VII. Obciążenie pracą studenta

Forma aktywności studenta	Liczba godzin
Liczba godzin kontaktowych z nauczycielem	75
Liczba godzin indywidualnej pracy studenta	45

VIII. Literatura

Grupy w języku polskim

Literatura podstawowa
Malepszy S. Biotechnologia roślin. PWN, Warszawa, 2009.
Woźny A., Przybył K. Komórki roślinne w warunkach stresu. Tom II Komórki in vitro. Wydawnictwo Naukowe UAM, Poznań, 2007.
Stokłosowa S. 2004. Hodowla komórek i tkanek. Warszawa, PWN
Literatura uzupełniająca
Fizjologia roślin pod red. Kopcewicz J., P.W.R. i L., Warszawa, 2006.
Artykuły w czasopismach: Postępy biologii komórki, Postępy biochemii, Kosmos, Biotechnologia
Freshney R.I. Culture of animal cells. A manual of basic technique. Wiley, 2005

Grupy w języku angielskim

Literatura podstawowa
Davis J.M., Basic Cell Culture. Oxford University Press, 2002.
Doyle A., Griffiths J.B., Cell and Tissue Culture, Laboratory Procedures in Biotechnology. Wiley, 1998.
Freshney R.I. 2010. Culture of animal cells. A manual of basic technique. Wiley-Blackwell
Literatura uzupełniająca
Taiz L., Zeiger E., Plant Physiology. Fifth Edition, Sinauer Associates Inc., U.S. 2010.
Fundamental techniques in cell culture. ECACC Handbook
Cell Culture Manual, Sigma Life Science, 2011-2014